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AMERICAN DYESTUFF REPORTER

Including the Proceedings of the
AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

VOLUME XV DECEMBER 27, 1926 NUMBER 22

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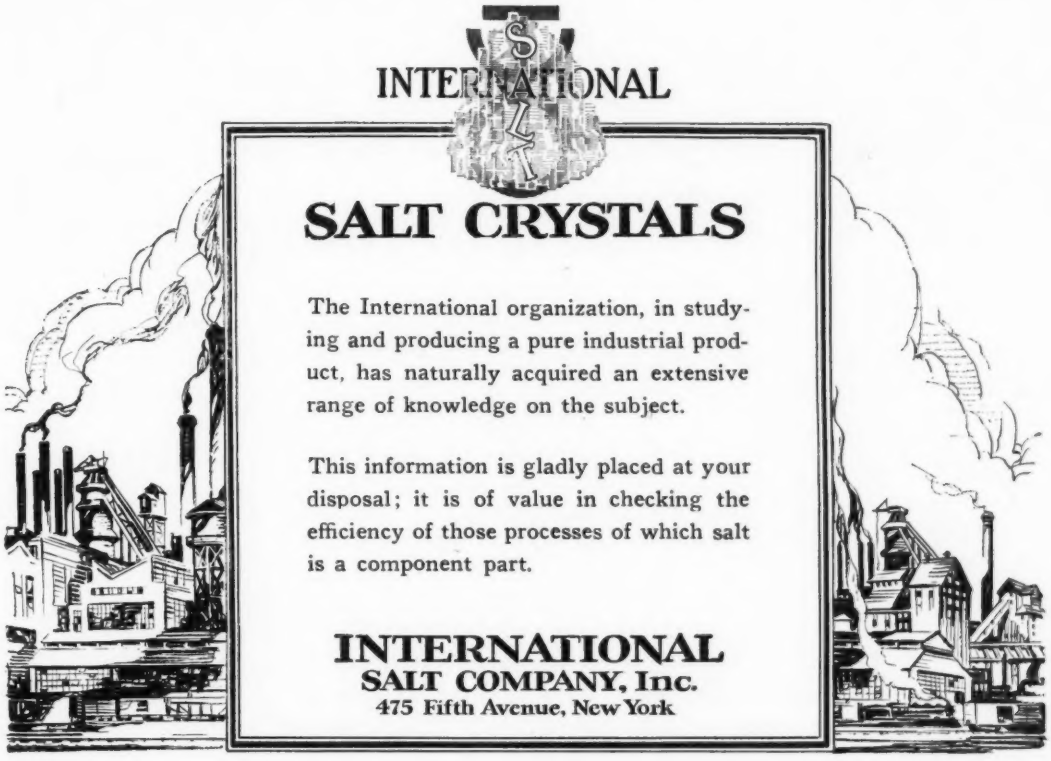

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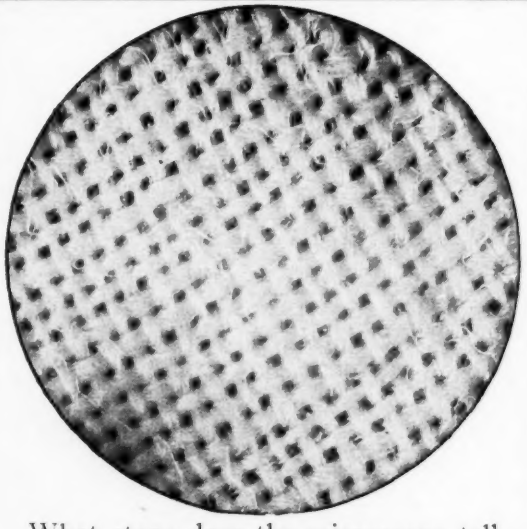

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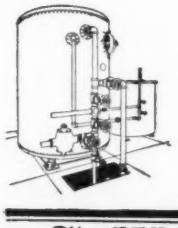

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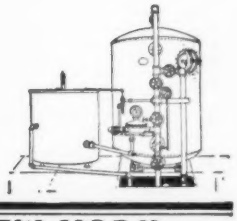

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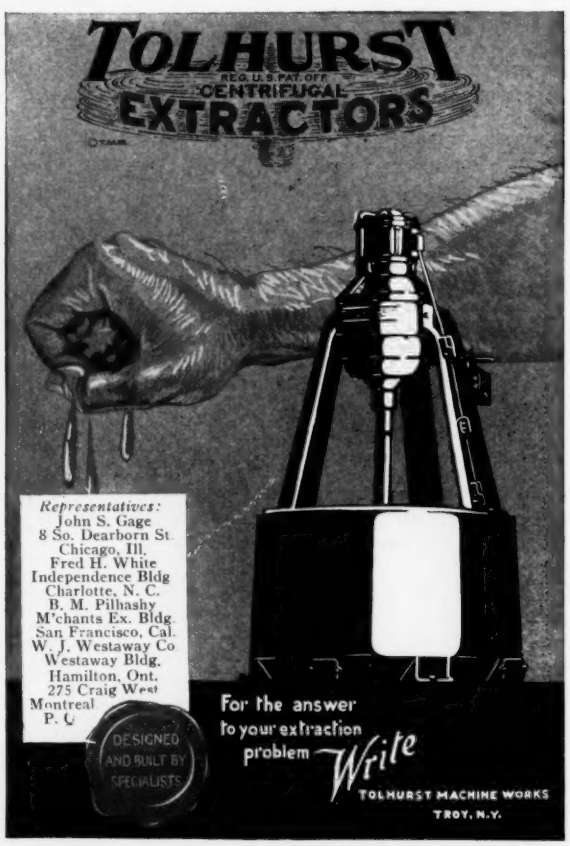

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1924 . .	5,536,646	1,680 "
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1926 . .	3,857,008	479,600 "
	(1926 ½ yearly figures)	(Estimated on ½ yearly sales for 1926)

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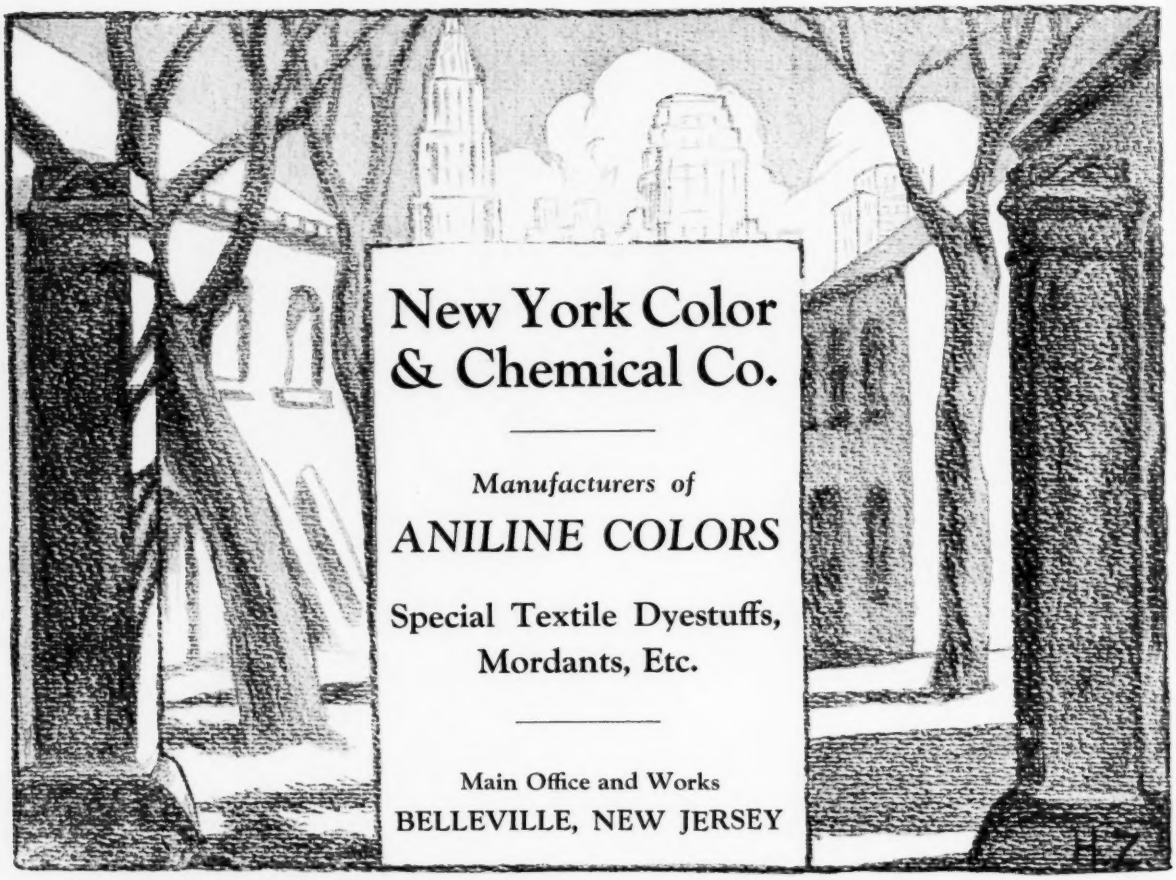

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VOLUME XV NEW YORK, DECEMBER 27, 1926 No. 22

Hard Water and Its Effect On the Scouring and Dyeing of Cotton and Wool Unions

Hardness in Woolen Processing—Dyeing of Union Goods—Methods of Feeding On—Use of Basic Colors

By MERRILL G. MORRIS, B. T. C.

THE ill-effects of hard water in the scouring and dyeing of textile material in general, and in the scouring and dyeing of union material, in particular, may be and often are, grossly underestimated. Just because water from a certain source may taste good, look clear, or have no objectional odor, it is not safe to say that that water may be good water for commercial textile scouring and dyeing. In fact, it is very rarely true that ideal water for scouring and dyeing is found in sufficient quantities for commercial use.

Most natural waters, excepting rain water, contain a variety of impurities in the form of dissolved gases and mineral salts depending on the nature of the earth at their sources, and the nature of the ground over which or through which the waters might have subsequently passed. While we ordinarily consider rain water as the purest source of natural water, this too, will occasionally contain dissolved gases if collected in the neighborhood of a large manufacturing center.

Water for textile purposes is generally obtained from rivers, lakes, or wells from which it is relatively easy to secure a steady volume of fairly uniform quality. Water from rivers and lakes is composed mostly of surface waters having a relatively small proportion of dissolved matter like salts, etc., present, but often containing a relatively larger amount of suspended matter of vegetable origin. On the other hand, water from springs and wells is generally found to contain a larger amount of dissolved salts and practically no suspended matter.

Hardness in Woolen Processing

The dissolved salts in river, lake or well waters are usually the carbonates, bicarbonates, sulphates and chlorides of calcium, magnesium and sodium, and it is these salts of calcium and magnesium which generally cause the troubles encountered in scouring and dyeing. Waters containing these salts are, therefore, called "hard waters," principally for their characteristic tendency to prevent soap from giving a lather when used in these waters, without the use of some softening substances like soda or ammonia. Suspended matter generally causes no difficulties as it is removed by filtration.

In the scouring of woolen or union goods where only hard water is available, it is absolutely essential that softening compounds such as soda ash, ammonia or tri-sodium phosphate, etc., be first added to the washer and the goods allowed to run in this softening bath before any particle of soap be allowed to come into contact with the fabric. By following out the above it will be found that all hardness is counteracted without the precipitation of the troublesome, sticky and insoluble, lime and magnesium soaps either within the wool fiber itself or on the surface of the fabric. In no case, however, will a real good lather be produced such as would be obtained with soft water.

After the goods have run the required fifteen to twenty minutes in the soap bath they must be rinsed off till all traces of soap are entirely removed. In doing this we encounter the dangers and possibilities of precipitation of lime and magnesium soaps again unless a small quantity of alkali (soda ash or ammonia) be added once or twice during the rinse-off operation, for the hard rinse water coming in on the soapy goods is just about as dangerous as putting soaped goods into untreated hard water. In general, it may be said that a long, hot alkaline rinse with gradual cooling will be found to be safe practice if handled with care. Rushing the work at this point will not do, however, for any precipitated lime or

magnesium soap shows up immediately after dyeing in the shape of stains, streaks, or clouds if present in relatively large amounts. If only a small amount be precipitated it may be detected by the disagreeable odor of the goods after finishing, even if no stains appear. Occasionally, it will be noticed that poorly washed goods containing precipitated lime or magnesium soaps will dye level in one color while dyeing streaky in another color, the difference being due entirely to the difference in the dyestuffs used; some dyestuffs are unaffected and others very sensitive to the presence of precipitated soap. Cotton and wool union goods containing even a slight amount of precipitated soaps should never be allowed to stand for any length of time between washing and dyeing, as goods in such a condition produce mold and mildew growths in a surprisingly short time together with a disagreeable rancid odor unless treated chemically with mold-resisting compounds such as formaldehyde. Such difficulties do not ordinarily occur where soft water is used.

Dyeing of Union Goods

As regards dyeing in hard water (and by hard water we refer to calcium and magnesium hardness, about 13 grains per gallon and about evenly divided between calcium and magnesium content), it may be said that all-wool dyeing with straight acid colors presents no difficulties providing the goods can be scoured clean previously. Clouds and stains will, of course show up on finished goods if improperly scoured.

The greatest difficulty with hard water is encountered in the dyeing of union goods, the problem being varied and changed, at times depending upon the color and fastness desired and the type of goods to be colored. That is, whether both the wool and cotton are to show upon the face of the goods after finishing or if only a wool face is desired to show after finishing. The first we will call mixed goods and the second wool-faced goods.

There are always two methods of dyeing at the disposal of the union dyer, the one-bath or union method, and the two-bath method. The one-bath or union method, where both fibers are dyed at the same time, is by far the more preferable of the two for either wool-faced goods or mixed goods, provided the dyer has at his disposal a good soft water supply. In the event that the water supply is hard, then better results can be obtained with most colors by the use of the union or one-bath method for mixed goods, and with the two-bath method, where the wool is dyed first and the cotton afterward, on wool-faced goods.

The union or single-bath method is to be recommended in all cases for mixed goods, care being taken to select suitable dyestuffs capable of matching the desired color. By suitable dyestuffs we mean those dyes which tend to dye cotton and wool the same or nearly the same depth and color at the moment the dye kettle comes to the boil. For use in hard water a list of such suitable colors which would work well together is distinctly limited, while in using soft water this is not true. A list of some of the better colors to use in hard water would include such dyestuffs as follows:

Diamine Fast Red F.
Benzo Fast Orange S.
Miniosa Z.
Trisulphon Brown B.
Diaminogen B.

Some of these colors are expensive to use in full shades, but give so little trouble in working that they are more than worth the cost. In case a shade cannot be matched exactly with some of these more suitable colors, we have other colors which tend to dye the cotton exclusively or the wool exclusively, and shading with these latter colors will generally make it possible for us to match the desired color. Careful sample dyeing or pot dyeing to obtain the proper formula will enable the dyer in many cases to eliminate feeding on in spite of the handicap of hard water.

Method of Feeding On

In case the color is not up to standard when the dye kettle gets to the boil, the steam must be shut off anyway, for with hard water union colors cannot be boiled, except in rare instances, without giving almost entirely onto the wool, thereby leaving the cotton undyed or nearly so. In case feeding on is desired it must be done in a fresh lukewarm bath made alkaline with some suitable agent such as soda ash, ammonia or tri-sodium phosphate, in which case both cotton colors and neutral dyeing wool colors can be made use of. In dyeing by the union method it is always best to leave the wool a trifle lighter than the desired color while dyeing the cotton to as near a perfect match as possible. This gives the piece a very desirable appearance when finished which might be described as "solid looking." This method has the advantage of making the cotton and wool look practically the same and gives much better production than the two-bath method.

In the two-bath method for wool-faced goods, we meet a somewhat different problem at the start. To begin with, the wool faces are often made up of two, three or more different wool stocks on shoddies, all of which would tend to pick up the dyestuff at a different rate if dyed in a union bath with hard water where they could only be heated to the boil and not boiled longer. Thus we would get a mottled or

(*Continued on page* 892)

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

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SIXTH ANNUAL MEETING

OPEN FORUM

[EDITOR'S NOTE.—*The full report of the Sixth Annual Banquet appeared in the Proceedings of December 13. Below is the report of the Friday evening Open Forum and Saturday morning technical sessions, the latter including committee reports and papers presented, with the discussions that followed. The report of the Saturday afternoon session will be published in the January 10 issue of the Proceedings.*]

The Open Forum session of the Sixth Annual Meeting of the American Association of Textile Chemists and Colorists convened on Friday evening, December 3, in the Charlotte Hotel, Charlotte, N. C., Vice-President Dr. E. H. Killheffer presiding.

Chairman Killheffer—The meeting will please come to order.

Before we start, there are just a few general subjects I should like to mention.

. . . Chairman Killheffer then made an announcement with reference to railroad certificates. . . .

Chairman Killheffer—I might say further, before we start, that we certainly regret very much indeed the fact that Professor Olney is confined at home ill, and that he cannot be with us at this annual meeting which, in fact, is the first one that he has missed.

We seem to have had great mortality among our executives in this Association. We lost a vice-president this year and Professor Olney is now ill, although, fortunately, he is on the way to recovery, and I am just substituting for him.

The subjects you find on your program are suggested subjects that have come in to the Council from the membership at large. You will understand that this meeting is what its name implies, an open forum, and you are not confined to these subjects. You can introduce anything that you like, provided you get a chance to do it. (Laughter.)

PROPER METHOD OF TESTING SULPHUR COLORS

The first subject suggested is very interesting, indeed, in this part of the country particularly: the proper method of testing sulphur colors. If someone would like to open that discussion I should like to have him do so; otherwise, I might be tempted to call on someone to open it.

Dr. R. E. Rose—Mr. Chairman, I think I am responsible for suggesting this topic. About as contentious a subject as one could possibly raise at any meeting of textile chemists would be that of standardizing colors in general and some colors in particular.

In my work every day I have to try to make categorical statements about the actual strength of dyestuffs, and sometimes it isn't altogether easy to be quite sure of one's self and here in this group of friendly textile chemists I should like to bring up this subject for discussion so

that I may have the very great advantage of your helpful suggestions.

If we do some testing and send the test out to a salesman he will say, "Well, this test is all right but the mill test doesn't look like that, because they do it in a practical way."

That is the first blow. How can you make a laboratory result, which has to be a laboratory result, look like a practical result?

The idea is, without any question, to make a small test resemble in every possible way the practical result. But you don't get that result simply by trying to imitate the conditions of the large scale operation, and that is the first point I should like to make. I should like to have your opinion about it.

Fortunately, most sulphur colors don't give us much trouble. They are almost foolproof and no matter how you do it you will get pretty much the same results. But there are some sensitive colors (like the Bordeaux, the greens, some of the blues, and here and there a yellow) that give very different results under different conditions of treatment.

From the dyestuff man's point of view, there is a tendency to make the test show the color to the very best advantage, and we can say that in most cases those delicate colors show up better in a cooling bath started at a high temperature and allowed to cool down, but, very obviously, that is about as far from mill conditions as you could possibly get.

Can you substitute dyeing at a boil, even though it makes the color look very bad? I don't believe you can, because when you try to get the temperature up you fail to meet another absolute essential of any standardizing method: you cannot get concordant results, and you must remember it is a testing method and as a testing method it must give concordant results to be worth anything; I submit to you that if you raise the temperature very high for those sensitive colors and get to the boil you will find your results so erratic as to be practically worthless.

Even if you get close to the boil the operation becomes frightfully temperature-sensitive and control is practically impossible. I should like to know what you think about standardizing those particular colors at a temperature of about 180 deg. Fahr. It doesn't show up the color to the best advantage but I think it gives about the best results. That is my first suggestion, and I should like to have your opinions on it.

Next point: What are you going to do to show such properties in a standardizing or comparative way as the characteristics of the color in a standing bath? Have you any good method to suggest to me? If you have, I should like very much to know about it. We all know that there are Sulphur Blacks, for instance, that show up on a straight dyeing 10 per cent stronger one than the other, let us say. Then, if we run the two colors against each other, at about the fifteenth bath we may find the one that was weak at the start is gaining so fast on the other that the strength is quite a different ratio. Well, we cannot stop and run fifteen baths on every sample of color that comes in.

Is there any method at all of covering that point? It is a very serious one, both from the standpoint of the seller of dyestuffs and the user of dyestuffs; with the market as competitive as it is now, fractions of a per cent have to be calculated.

I should like to suggest these as subjects for some discussion.

Chairman Killheffer—Well, that subject is open. We should like to hear some discussion on it.

P. H. Stott—Dr. Rose has raised a point that is very interesting from the standpoint of the dyestuff manufacturer at all events, and in the essential points of his discussion I think those of us who have had experience in testing sulphur dyestuffs from the laboratory standpoint will agree.

Our experience has been that we get much more consistent results in testing sulphur dyestuffs when we run them at a definite temperature, varying from 160 to 180 deg. Fahr. Also, we have found that in certain instances much more consistent results are obtained in isolated cases of individual dyestuffs, where the amount of sulphide in ratio to the quantity of dyestuff which is used is controlled perhaps to limits which are less than would normally be used in the mill. I have in mind certain dyestuffs in which much better results are obtained both as to shade and strength if the quantity of the sulphide is reduced to even as little as one-quarter of the amount of dyestuff used.

With regard to direct dyeing sulphur dyestuffs we find in the laboratory, at all events, that if such colors are run at the boil, as is the usual practice in the mill, the results obtained are so uneven and inclined to bronziness as to render accurate judging of the strength almost impossible. I agree with Dr. Rose in his suggestion that we should receive from the consumers of such dyestuffs their experiences as to what *they* find are the best results which can be obtained in the mill as applied to laboratory uses, merely from the standpoint of a standardization of testing for accurate determination of the strength and shade. I think it is a subject which lends a great many possibilities for discussion as to the means of determining such a method.

Chairman Killheffer—Is there anything further in connection with the testing of sulphur colors? How about some of you gentlemen in textile mills? Don't you want to make any comments? The other two speakers have asked some questions.

Eris J. Monoghan—Mr. Stott spoke about the question of temperature in the mill being at the boil. Does he actually mean 212 deg. Fahr. at the boil, or isn't that temperature 200 deg. rather than 212 deg.?

Mr. Stott—Yes, I presume so.

Mr. Monoghan—The reason I ask that question is because we did a large number of tests in regard to the temperature running from 200 deg. down to 180 and 160, and we found that our results changed considerably, not alone on the question of sulphide, but, of course, on the question of volume, and the way in which we brought the dyestuff into solution had a good deal to do with that.

The point I should like to bring up here is that, for instance, on certain colors such as Dr. Rose mentioned—Bordeaux—a matter of 10 or 20 degrees will make a very big difference in the final results.

Chairman Killheffer—Some of you gentlemen who use Sulphur Bordeaux tell us about your method of testing. Mr. Moran, can you throw any light on this subject?

George A. Moran—I don't believe I can throw a whole lot of light on it.

We get the best results by using a large quantity of sulphide. The previous speaker spoke of one-quarter the weight of dyestuff of sodium sulphide, presumably concentrated. I use as much as four times that and also a rather large quantity of salt, securing a complete exhaustion. Of course, the shade that you get varies according to the conditions under which you dye, but you can't get results that will exactly agree with what you get in actual practice in the mill in any case because you are dyeing in the mill under many different conditions. For instance, in one case you may be dyeing yarn in the long machine. In another case you may be dyeing in an enclosed machine like the Brandwood, or some other machine of that type. The results are radically different in shade. The laboratory method can give you only comparative results anyway, and you can get a very much more complete exhaustion by using a large amount of sulphide and a large amount of salt. I find that more satisfactory.

Chairman Killheffer—What about the question of temperature in a color like Bordeaux?

Mr. Moran—I usually run a uniform temperature in any case, pretty near the boil.

Chairman Killheffer—Would you say 200 deg.?

Mr. Moran—Yes, I would say 200.

Chairman Killheffer—Is there any further discussion on the question of testing sulphur dyes?

Mr. Marlow—I should like to mention my experience in connection with the blues.

I agree with the last speaker in regard to the sulphide, but not in regard to the temperature. If you get up around 200 deg. on blues or even on Bordeaux, my experience has been that you lose the redness of shade of the Bordeaux, as well as the strength; and with the blues, when you go beyond 4 per cent of sulphide, or four pounds to one pound of the dye, you get a thinner and a greener shade.

What I have found with regard to the testing of sulphur colors, in comparison with an actual mill test, is that if you run at near 160 or 170 deg. you get a fuller and a bloomier shade, but that, of course, is somewhat contrary to actual mill conditions.

A bath run as nearly as possible with the same ratio of yarn or of stock to the amount of water in the laboratory, of course, is what we are all after in testing colors for mill use. The Bordeaux, which we have mentioned several time, I might say are perhaps the poorest from the standpoint of quality of all of our colors.

So that the amount of sulphide used will vary with one color as against another. I have seen greens with which you would get the best results by running down to a quarter of a pound to one pound of sulphide. I have seen other greens with which you would get the best results with one-half pound or three-quarters.

My way of testing them would be to take a sulphur color (almost any one of them, with the exception of standards such as blacks and some of the browns), a half pound, one pound, and one and a half pounds, then run them with the bath as nearly as possible to what I would expect the mill bath to be, in ratio of goods to water, and with as nearly as possible the same amount of salt. I do not think that excess salt is a great deal of help in a laboratory test. It gets the full value from the color, but it is contrary to the mill results.

Chairman Killheffer—As I understood your remarks, Mr. Moran, you had in view a correct and accurate evaluation of the dyestuff against a given standard rather than duplicating the result of the dyehouse?

George A. Moran—Yes, in the comparison of one color with another more particularly than with reference to comparing the results with what you will get in the mill. In order to compare them with what you will get in the mill, you would have to vary your conditions according to the particular method that you were going to apply in the mill. In different cases, that would be radically different.

Mr. White—The more sodium sulphide you use, the more salt you will have to put on to throw out that sodium sulphide which gets down on the yarn, I find, in the enclosed machines. In a long chain, there is less salt required to the amount of sodium sulphide.

I should like to have a little discussion on that point.

Hugh Christison—I can appreciate some of the difficulties that Dr. Rose has spoken about and two of the other speakers have mentioned. That is the concentration, and from experience I believe the best way to get laboratory results to imitate the practical results is to avoid long boiling. I believe that a three-minute boil is

about the best time to use in dyeing the laboratory tests, and that the concentration should be about ten to one, water to the cotton.

That may sound impossible, but it can be done, and if the concentration is made at that ratio, ten to one, and the boiling limited to about three minutes, I think the results will imitate the practical fairly well in a good many cases.

In order to work the cotton at all at the ratio of ten to one, it will have to be wet before it goes into the bath.

Chairman Killheffer—Is there any further discussion?

Walter Haskell—We dyers can accommodate ourselves to a slight difference in strength or a slight difference in shade. But if we are dyeing a warp or a heavy mode shade to be woven up into worsted, for instance, it has to be scoured, crabbed, steamed, cross-dyed, singed, and various other things, and then we have to store it in a case for six months. What will that shade be like when the goods reach the customer? Is it possible to test a sulphur color in that respect?

Chairman Killheffer—You have in mind now the aging of the color, haven't you?

Mr. Haskell—Yes. Is it possible to produce that in a short time in any accurate way?

Walter Hass—In answer to that question, I think if it were given a bath of hydrogen and peroxide, that might help to reproduce that condition.

Eric J. Monoghan—I may answer the question in part by saying that on that proposition we have been using steam oxidation after dyeing, which seems to give us fairly good results. We checked it in this way: we prepared a set of dyeings one day and steamed them, and we had another set of dyeings which had been lying around for a week or two, and those results checked very well.

Chairman Killheffer—Is it your thought, Mr. Monoghan, that the maximum oxidation or aging was reached after the sample had lain around for several weeks?

Mr. Monoghan—I wouldn't say the maximum oxidation, but certainly it went a good way towards that.

Chairman Killheffer—Does anyone else want to say anything about the testing of sulphur colors?

Dr. R. E. Rose—May I ask one question of Mr. Christison?

Mr. Christison, after the three minutes, do you rinse right away or allow it to stand in the bath for a few minutes?

Hugh Christison—I take it directly from the bath and plunge it in cold water.

Oscar H. Forsdale—In regard to the testing of dyestuffs, it strikes me there are two problems that are connected in this respect; first of all, to determine whether one type is like another and in the second place, to imitate as nearly as possible the mill conditions.

Of course, if it is from purely the laboratory standpoint of determining whether the standards are alike, that is easy enough, but it seems to me (I am speaking from the piece goods standpoint only; I don't know much about warp dyeing) it is possible to imitate a jig, for instance, by putting a bar in the bottom of a dish and just running the cloth underneath this bar and giving it six ends, or eight ends. That gives a pretty good imitation of a jig.

As for pads, when you are doing sulphur tints, it is a very easy matter to determine how the color is going to act by getting a wringing machine and attaching a motor to it. That gives an imitation padder.

In that way you can determine (I am speaking simply of jig dyeing and padding) how those colors are going to act.

If you are looking for exhaustion troubles, I think you can find with a certain degree of accuracy how those colors are going to exhaust.

That would be my idea of imitating mill conditions, as far as jig dyeing and padding are concerned. I should think that the gentlemen who are engaged in warp dyeing and Franklin Process might be able to devise miniature machines whereby they could determine with some degree of accuracy at least just how these colors would act under those conditions.

I just merely offer that as a suggestion. (Applause.)

P. H. Stott—With regard to the exhaustion of colors in general, raised by the last speaker, I might say that in the laboratory we have found that the speed of exhaustion (which, of course, is quite important from the standpoint of pad and jig dyeing) can be fairly accurately determined by making four or five successive five-minute dips or two-minute dips, if you wish, in the same bath. By that, I mean to say that you take, say, a 5 per cent dyeing of color and have ready five pieces of cotton cloth and immerse each piece separately for a period of two to five minutes, at the recognized dyeing temperature (whatever may be the best agreed upon) and then judge by that the relative speed of exhaustion, by comparing two particular standards which may be in question.

In direct colors, as well as sulphur colors, we have found that such a test has a great deal of value in judging the relative speed of exhaustion of various colors.

Chairman Killheffer—I think we had better get on to our other subjects. One of the subjects suggested had to do with the relative merits of various types of kiers. We called up some folks here in Charlotte this morning and learner that Mr. Wallace Taylor was here, that he was well informed on the subject, and would be glad to tell us something about two of the types, that is, the pump and heater and the injector type.

If Mr. Taylor will tell us about that, we will appreciate it.

Wallace Taylor—Mr. Chairman and Gentlemen: When

speaking of injector kiers and pump kiers, it is necessary to remember there are really two types of each.

I don't know how old the injector kier is. It dates 'way back. The first one brought out was designed with the idea of circulating directly live steam at reduced pressure from the boiler, lifting the kier liquor from the bottom of the kier into an overflow of either one or more pipes, diffusing the liquor onto the top of the goods.

A new development has been brought about within the last fifteen years whereby the discharge of the liquor and the control of the steam consumption is handled electrically by time valves.

Injector and Pump Kiers

As to the merits of these two kiers, it is decidedly an open question on the part of the practical man and in a great many instances men install kiers of these types simply by preference.

The pump kier is even older, some of you may be surprised to learn. It is a good deal older than the injector kier. I am informed from a reliable source that the pump kier was invented over forty years ago. It was rejected generally in Great Britain because there was no satisfactory method of driving the pump, except by a belt in a very wet place, and where the belt would stretch it was not considered foolproof.

With the development of newer type small motors it has been possible to connect the pump directly to the pump propellor-shaft, directly to the motor. One motor manufacturing concern in particular has developed a totally enclosed motor which is alkaline and acid-proof as well as moisture-proof and it stands up under the most impossible conditions. This I know from five or six years' actual observation in plants both in New England and the South.

The difference in the two types of pump kiers is simply as regards the construction of the heater. The liquor is circulated in one kier through the inside of the tube and the steam is on the outside of the tube, enclosed in a sheet iron casing, as it were. In the other case, the steam runs up the inside of the tube and the liquor is circulated on the outside of the tube.

Some of you men in bleacheries can probably realize, particularly on a lime and caustic boil, where trouble may result in using a pump kier of the latter type. The tube becomes encrusted on the inside surfaces, where you can't get at them without taking the heater apart. As far as I can see, that is the only big advantage in the type of kier that has the liquor passing down the inside of the tube because it is possible to remove the headers on the heater and clean them out with an ordinary boiler tube brush.

Personally, I don't wish to enter into any discussion as to the merits of the injector kier against the pump kier because my company sells both types of kiers, although I am really prejudiced in favor of the pump kier because I have had a lot of experience with it, against others. But if there are any questions anyone would care to ask, as far as I am able to do so, I will be glad to answer them.

Chairman Killheffer—Are there any questions you would care to ask?

Mr. Taylor—I would suggest that on the motor pump and heater kier it is very much easier to handle a temperature control. The body of liquor is the same at all times, except when it expands due to the heat, and the temperature of the kier can be controlled and thereby steam intake can be shut off or started up, according to the thermostatic control.

Finally, as to the operation of an injector kier against a motor pump and heater kier, there have been great claims made for certain types of injector kiers about saving steam. I find, personally, that generally that is controlled by absolutely local conditions in the mill. You don't know in some plants how far the kiers are from the boilers, how well they are insulated, what type of goods they are handling, and how they run them into the kiers, and so on.

I wish to leave one thought with you and that is this: with the motor pump and heater kier, it is possible to circulate the liquors in the kier without using steam at all.

I have in mind one plant in New England where they have made extensive experiments on different types of kiers, mainly from the standpoint of saving steam, which with expensive coal is quite a problem. This particular plant uses a caustic boil on light goods for ten hours. That is, they boil for ten hours under steam pressure. They feed steam for about three or three and a half hours and bring the kier up to twelve and a half or fifteen pounds pressure, after having expelled all the air, of course, and then shut off the steam pressure and circulate for another six and a half to seven hours. If their valves, and so forth, are in proper condition (which is necessary) they will have at the end of the boil anywhere from four to six pounds of steam pressure still left on the kier and they will take out just as good a boil as though they had been feeding steam every minute of the boil.

That, in my estimation, is the successful way to use a motor pump and heater kier.

I think that is all I can say on the subject.

Chairman Killheffer—Are there any questions anyone would like to propound? I am sure Mr. Taylor will be able to answer them. If there are no questions, we thank you, Mr. Taylor, for coming down and presenting this subject.

Developments in Acid Colors

The subject "New Developments in Acid Colors" was suggested. The suggestor or suggestors of that subject

had in mind products like Neolan and other colors of that general character. The gentleman who it was suggested could probably tell us something about it, to open the discussion, isn't very far from me and I will ask him if he won't open this subject.

Dr. Wuth!

Dr. Berthold Wuth—"New Developments in Acid Colors" need not necessarily refer to the Neolan colors. We have to go back a little further to the time when we passed over from the very fugitive colors, the sulphonated triarylmethene colors, to the faster type, such as the pyrazalone azo colors of the Fast Yellow and Fast Orange type.

That was really the first step in the direction of producing fast acid dyeing colors.

Apart from that, or parallel to that, was the sulphonation of anthraquinone products of the alizarine, saphirole, rubinol, astrol types. They are not modern, but of course during the time of the war modern discoveries practically rested and they have become now more active and are practically modern now.

The latest developments were as the Chairman said, the Neolan colors. They are acid colors which have the qualities of after-chromed colors. That is a matter that I wished to touch on to-morrow, but since it has been brought up to-night I shall say just a word on it. It is the endeavor to substantivate adjective dyeing. It started in the field of cotton dyeing by eliminating aftertreatments, and it was carried further to the extent of producing compounds in the dye manufacture which hitherto the dyer had to do in the dyehouse.

The Neolan colors are not strictly to be compared with the acid colors as we have known them. They bear quite a different character. As a typical acid color you would pick a color that will exhaust and behave in the bath the same as Patent Blue, exhaust slowly, and dye level.

The newer kinds of colors, which are metal compounds, have great affinity for the fiber, and as all colors with great affinity rush on to the fiber, so do these and the result is unlevel dyeing at the start. When the heat of the bath is increased these compounds that have rushed on the fiber become more soluble and are, you might say, stripped from the fiber, and seemingly leave part of their constitutional metal on the fiber; afterwards they exhaust the same as an ordinary Patent Blue would do.

If these colors have not swept the carpet, you might say, and found general application in very rapid time, that is nothing to be astonished at, when you remember that Diamond Black was put on the market in the late eighties and it was not until the nineties that anybody would buy it. Every new color takes time, and if anyone takes a color of this new type and tries to dry it in the ordinary way, like an acid color, he might possibly be disappointed and discard it. But if he is persevering and wants to study the nature of these new acid colors he certainly will find that they are what they are claimed to be; he will find that they have the qualities claimed for them: level dyeing, to the extent claimed, and they are as fast to washing, fulling and light as an afterchromed ortho-oxyazo dyestuff. (Applause.)

Chairman Killheffer—Are there any questions anyone would care to ask on this subject?

Walter Hass—I should like to ask Dr. Wuth whether these colors will dye silk and whether they would be fast at 160 deg. Fahr. with 2 per cent soap solution.

Dr. Wuth—As I understand, your question is with reference to dyeing silk and being fast on silk at that temperature?

Mr. Hass—Yes; fast to washing.

Dr. Wuth—They do dye silk and once on the silk they will stand 160 deg. washing with the concentration of soap solution that you mentioned. However, the colors on the pure silk do not look as brilliant as they do on wool. They have the appearance of being overdyed. By that, I mean to say they appear as though there was too much dyestuff on the fiber, as if the dyestuff was covering up the fiber; that is, the silk loses its brilliancy to a certain extent. But, on the other hand, they have proved to be exceedingly valuable on weighted silk. That quite stands to reason: You have a metal dyestuff and you have a metal fiber.

Mr. Hass—Is that true of a yellow dyestuff? Have you done a great deal in yellow?

Dr. Wuth—Oh, yes, several Neolan Yellows—there are three of those. They will dye on the metal weighted silk and that probably is due to the fact that you have a colloidal fiber and a metal deposit in the weighting in a colloidal state, and the dyestuffs with their high molecular weight are undoubtedly highly dispersed colloidal substances; therefore, the dyeing of the weighted silk is due to colloidal adhesion or cohesion, whatever it may be.

Mr. Stott—Dr. Wuth, in dyeing combinations of worsted and silk is it possible to dye the Neolan colors to leave white silk effects and still retain the fastness on the wool?

Dr. Wuth—It is, I think, in light to medium shades. But the silk will not remain white. However, the Neolan colors being of the azo type they are naturally easily reduced and a bath of, say, one gram of sodium hydrosulphite to a liter will clear the silk to practically a white. So that by dyeing the combination, the union, and treating it with a very weak bath of sodium hydrosulphite afterwards, you can get white effects on the colored ground and the color on the wool fiber will naturally retain its fastness.

Mr. Stott—Will it also retain its depth?

Dr. Wuth—I think so. There will be hardly a change in depth. One gram in a liter will hardly strip a Neolan

color from the wool. I don't think that a change of shade would be perceptible. It is just that slight coloring of the silk that will disappear.

Mr. Hass—I might ask if those colors are dischargeable when they leave a white?

Dr. Wuth—Not all of them. A number of them are dischargeable, but not all, and a certain number are dischargeable to the extent that you could use them to print a colored discharge on them without impairing the brilliancy of your discharge color. Others are difficult to discharge and couldn't be used for discharge work at all. I couldn't mention the various products which are dischargeable and those which are not. They would be forgotten anyway if I were to give them to you now, but they are easily enumerated. There are some that are dischargeable, some suitable only for color discharge, and others not at all.

Mr. Hass—Is your Neolan Pink the same as Palatine Fast Pink?

Dr. Wuth—I am sorry I cannot answer that. I do not know what the Palatine Pink is.

Fast Light Blue Needed

W. D. Appel—I have a question which is more general which I should like to ask at this time. Can anyone suggest a color for wool of the brightness of the Alizarine Saphirole, which is markedly faster to light, or distinctly faster to light? This color would be of interest in connection with some work being done by the Government in selecting a standard blue for the American flag. It is, of course, essential that the color be fast to light, water, salt water, and mild washing. Alizarine Saphirole is not fast enough.

Mr. Hass—Answering that question, I might say I found Alizarine Blue SKY to be a little faster.

A. H. Pierce—Answering the question of the last speaker, there has been a new development in the line of acid alizarine colors which I think every wool dyer will be interested to learn about, and that is the bringing out of the Alizarine Supra Blues. The Supra Blues have a decided advantage over the old Alizarine Saphirole or astrol type, in that they are very much faster to light, brighter, very much faster to salt water, and fast to perspiration.

The great disadvantage in using Saphiroles, particularly in linings, in combination with Fast Light Yellow, Alizarine Rubinol or Azo Fuchsine, has been the fact that the Saphirole spotted with water was not fast to perspiration. Linings made with a combination of Saphirole Fuchsine or Rubinol and Fast Light Yellow have invariably turned red, particularly under the armpits where the perspiration has attacked them.

The Supra Blue types which have been recently brought out have eradicated or eliminated that defect, in that they can be recommended as being practically fast to perspiration, salt water, and spotting.

The Alizarine Supra Blues and Supra Cyanines in combination with the Supra Light Yellows, also with the Rubinols, which so far as I know are not affected by perspiration at all, can now be used on linings to eliminate all objectionable features of changing with perspiration.

Dr. Wuth—The gentleman who spoke before asked for a blue faster to light for flag purposes than Alizarine Saphirole.

I had the occasion (I think it was in 1912) to attend the Fourth International Congress of Chemists and Colorists in Turin, Italy. It was just after the benzoylation of Indigo had taken place; that was the production of Indigo Yellow. We had the old Indigo Blue Friedlander brought out, and astounded the world with, Indigo Red, at the Society of Chemical Industry in Basle, and Engi and Froelich discovered the Indigo Yellow. It is a color which has an extreme affinity for wool and we made up a number of flags at that time, mainly, of course, in Turin—the green, white and red of the Italian flag. The green dyed with a mixture of Indigo Yellow 3G and Ciba Blue 2B, and the red with Ciba Red R. Aside from that we dyed other national flags, in which the blue used was an Indigoid Blue.

We took into consideration that for a flag all you want is fastness to water, fastness to light, and salt water, perhaps. All vat colors have these qualities and are extremely fast to light; especially Indigo itself ranks as the fastest color on wool and the brominated products at least have no lower properties, but they are much more easily applied, so that they can be dyed on piece goods, on woolen piece goods, and give everything that Mr. Appel would require for the square in the American flag.

Mr. Appel—I tried wool dyeings of Ciba Blue 2B of the desired color which, of course, is a light bright blue. A heavy dyeing of Ciba Blue 2B I think would be too dark, from the point of view of the artists of the Fine Arts Commission. I am not sure of that, but in the shades which were submitted Ciba Blue 2B did not stand up.

Dr. Wuth—In what respect?

Mr. Appel—To light. Of course, it was fast to the other agencies, but not to light.

Dr. Wuth—Well, of course, you are asking for something Utopian. There is nothing faster. (Laughter.)

Mr. Appel—That is the point that I must establish.

Dr. Wuth—If you want something faster than Indigo, I don't think anyone can offer it to you.

Mr. Appel—I am not sure but what Ciba Blue 2B would be perfectly all right in a much heavier shade and it would then be intermediate between the present standard which is almost a blue black—

Dr. Wuth—Is it, perhaps, on account of the color being too reddish?

Mr. Appel—That was one objection. It was a little dull and red as compared with some dyeings that had been made in the Alizarine Blues.

Dr. Wuth—There might be a possibility of mixing the Tetrabrome Indigo with the Dibrome-dichlor Indigo. (Laughter.) That is a Badische product and a mixture of those two would give you a much greener shade.

Mr. Pierce—Answering Mr. Appel's question, I did not perhaps make myself quite clear. As I understood his first question, he wanted a product which was faster to light than the Alizarine Saphiroles. Alizarine Supra Blue A is brighter and faster to light, faster to salt water, faster to perspiration, and faster to spotting with water than any of the older type Alizarine Saphiroles.

J. H. Hennessey—I would like to say, for Mr. Appel's benefit, that according to my information Indanthrene Blue WB is the fastest color of that shade on wool. It is a little greener in tone than Ciba Blue 2B, but it is faster to light and that was the prime consideration, I believe.

Mr. Appel—Indanthrene on wool?

Mr. Hennessey—Yes. It isn't dyed like an Indanthrene color on cotton.

Chairman Killheffer—We shall have to go on to some of the other subjects on the program, one of which is "Some of the Causes of Uneven Dyeing of Rayon." That is a big enough subject. Who wants to take a crack at that? (No response.) Well, I guess nobody here has any unevenly dyed rayon. (Laughter.)

Here is another rayon subject, if someone wants to talk about it: "General Handling and Finishing of Goods Containing Rayon." That is large enough, too.

Wallace Taylor—Mr. Chairman, I think in the finishing of rayon fabrics, all that is necessary is to use the standard light-weight finishing equipment for piece goods, with roller and ballbearings fitted to the various rollers of small diameters, particularly where friction is caused, especially where goods are running at open width.

In the vicinity of Charlotte there are a great many ginghams being finished, yarn dyed effect, and even though there have been practically no changes made on the finishing equipment (except lifting a top squeezer here and there) they are getting along very well with just an ordinary range of cotton goods finishing machinery. In one case particularly they have not even changed the heavy five-roll calender. They are passing goods with rayon stripes and rayon yarn through a five-roll calender.

From what I have seen, I am inclined to believe that rayon will stand a good deal more rugged treatment than the average finisher is inclined to admit, particularly in the condition after it has been bleached, semi-dried for tendering, and calendering, and sizing, etc.

As far as the bleaching of goods with rayon, or filling a warp is concerned, I don't think it is any great problem, if a concern fits up with a light-running so-called dolly washer or slack washer. I don't think there is anything very difficult about fitting up to run that class of goods. It is no more difficult to run a piece of rayon than it is to run a Terry towel.

Chairman Killheffer—We will have to pass along a little more rapidly on some of these subjects. If there is anyone here to discuss them, we want to cover them all. At the same time, I received a wireless a little while ago that Sir Harry Lauder has arrived in the hotel and he will appear before us in a few minutes.

Someone suggested the topic, "Useful Methods of Making Close Color Comparison on Textiles." I don't know whose subject that is, but would you like to state that briefly, Mr. Christison?

Close Color Comparisons

Hugh Christison—One of the gentlemen in the back of the room said he wouldn't talk because he wouldn't deal in bromides. I agreed to say a few words on this subject, but I am afraid I shall have to deal in bromides because I have nothing new and I am here simply because I have been asked to come.

The one thing in particular that I had in mind was the use of a knitting machine in the ordinary textile mill.

A good many times, in making close color comparisons we will take pieces of cloth and try them under hand, over hand, upside down, and various other ways, and we cannot always agree with ourselves. We use an ordinary knitting machine and find that by taking the two skeins of yarn and knitting them so that one comes after the other, we can see differences that are absolutely impossible or that we think absolutely impossible to see in any other way.

The light in this room is not very good, but I have a knitting that contains eight or ten dyeings of a particular color. As I said before, the skeins are almost indistinguishable but the bands, the light and the dark bands that you can see, are quite pronounced and are quite an aid in arriving at a judgment where there is a question of strength that is rather close.

I have another sample here that might be a little bit more conspicuous. I don't know whether you can see the difference in the top and bottom or not, but if you were to take them that way (illustrating) it would be almost impossible to see them.

We have also found the same method very handy in helping out in mill work in the case of mixed lots or suspected mixed lots. We all know what mixed lots of yarn do. They cause all sorts of filling bands and warp streaks, and things of that kind that produce seconds.

There is a knitting with three lots of the same yarn, the same count, and they all look alike. But when the knitting is dyed you can see the different lots very readily and very easily, and I think that an ordinary knitting machine would save almost any textile mill considerable money by preventing seconds that might otherwise occur.

The first sample I had was on cotton. This sample is on wool. There is one little trick in making the different batches of wool show and that is in the selection of color. The bands there are far more conspicuous than we would get in practice, but they would be conspicuous enough in practice to cause a second. If you will dye a compound shade, a mixture of Alizarine Cyanine Green and Diamine Fast Red F, you will find that the differences will be a little more difficult to see than if you used a combination that is considered a little more practical.

I have other samples here that show (you may look at them after the meeting is over, if you wish) differences in stock that we have been able to prevent by the use of the knitting machine. There (illustrating) is one that shows it quite conspicuously.

The other thing I wanted to show is something that they teach, I suppose, in almost every textile school, but I do not believe it is used in the textile laboratories as much as it might be, and that is simply taking advantage of the dyeing, rather, contrasting colors. For instance, I have here two yellows that apparently are of about the same strength. It would be pretty difficult to say that one was stronger than the other. Yet when the yellows are dyed with a color of a violet nature the difference in the strength of the yellows is far more apparent and makes it a great deal easier for the man who is selecting the color to see.

Most of us are pressed for time and we find that a great way to save time is by making a series of dyeings on the colors that we use most. These dyeings here are made with a constant amount of Gallocyanine and a varying amount of Alizarine Yellow. I will show more of the contrasting ones.

In making selection of a color all you have to do is make two dyeings, one of the color that you consider standard, and another of the color that you are examining. You can then match those with your book and very quickly put a numerical value on the color that is quite useful and that is borne out in dyehouse practice.

You can apply this to almost any color. It can be done just as well for red, blue, or any other color. Perhaps in this sample you can see the gradation in the shade from the redder to the yellower.

That is all I have to say. If there are any questions, I shall be glad to answer them.

Walter Hass—I would like to ask Mr. Christison if he can make an isolated dyeing of a yellow and then compare it with his book? I found that method entirely unsatisfactory because it should be made comparatively, at the same time.

Mr. Christison—I intended to make the point clear that you make two dyeings; one you make as a standard and the other you have in question.

Mr. Hass—What would be the use of referring to the book?

Mr. Christison—You refer to the book simply to give the comparative strength, the numerical value.

Chairman Killheffer—This opens up some interesting possibilities. Are there any further questions on the subject? If not, even though we still have several subjects listed for discussion, I think we will have to let them go over until to-morrow. If we have time on the program we will take them up then.

The Arrangements Committee, I understand, have prepared a buffet lunch that they are anxious to serve, and immediately thereafter they have planned some entertainment for you.

. . . Announcements were made with reference to the program for the next day. . . .

. . . The meeting thereupon adjourned at 9 o'clock.

SATURDAY MORNING SESSION

The Annual Business Meeting convened in the Hotel Charlotte, Saturday morning, December 4, at nine-forty o'clock, Vice-President Killheffer presiding.

Chairman Killheffer—Gentlemen, we will come to order.

Inasmuch as one of the first items of business is the election of officers and as it will take some time to count the ballots I should like to ask Mr. Johnson and Mr. Claflin if they will act as tellers, please, and count the ballots and report the results later.

We will now have the Secretary's Report.

Secretary's Report

For the Year 1926

The Council of the American Association of Textile Chemists and Colorists have held seven meetings in Boston since the last Annual Meeting held in Boston in 1925.

The Research Committee has held six meetings in Boston, and a great amount of work has been done by the different members in subcommittees.

The interest among manufacturers is steadily growing as evidenced by the increased Corporate Membership.

All the local sections are in a flourishing condition.

During the year we have added 119 Active, 45 Junior, and three Corporate Members. On account of nonpayment of dues, several names have been dropped, leaving a total membership of 741 Active, 155 Junior, and 11 Corporate Members. Thirteen Junior Members have

been transferred to Active Membership and there have been five deaths in the Association.

Respectfully submitted,

WALTER E. HADLEY, *Secretary.*

Chairman Killheffer—You have heard the reading of the Secretary's report. What is your pleasure?

Dr. W. M. Scott—I move it be approved as read, received and filed.

. . . The motion was regularly seconded and carried. . . .

Chairman Killheffer—We will now listen to the Treasurer's report.

. . . The report of the Treasurer was submitted by Walter C. Durfee. . . .

Treasurer's Report

GENERAL FUND

Cash on hand, November 9, 1925	$4,302.28
Balance of amount assigned to Research Fund	1,269.00
General Fund, November 9, 1025	$3,033.28

Receipts

Cash on hand, General Fund, Nov. 9, 1925	$3,033.28
Dues	4,393.00
Corporate Memberships	565.00
Year Book	151.40
Howes Publishing Company (refund)	93.06
Journals	20.75
Emblems	36.01
Interest from American Trust Co., Boston	88.06
	$8,380.56

Expenses

Administration	$1,862.20
Transferred to Research Fund, June, 1926	1,500.00
Journals	2,435.62
Sections	661.84
	$6,459.66

Total Receipts, General Fund	$8,380.56
Total Expenses, General Fund	6,459.66
Bal., General Fund, Nov. 10, 1926	$1,920.90

RESEARCH FUND

Receipts

Balance amount assigned to fund for 1925	$1,269.00
Received from contributions, 1926	1,169.60
Transferred from General Fund, June, 1926	1,500.00
	$3,938.60

Expenses

Expenses for 1926	$1,188.82

Total Receipts, Research Fund	$3,938.60
Total Expenses, Research Fund	1,188.82
Bal., Research Fund, Nov. 10, 1926	$2,749.78

WINTHROP C. DURFEE.

Chairman Killheffer—You have heard the reading of this report; what is your pleasure regarding it?

George A. Moran—I move it be accepted and filed.

. . . The motion was regularly seconded and carried. . . .

Chairman Killheffer—I am sure that we all regret exceedingly that our President, Professor Olney, cannot be here to-day because of illness. I am sure that he, too, feels very keenly disappointed that he cannot be here. I think it would be a very nice thing if we were to draft a telegram extending our greetings to him, and if it is agreeable to the members I shall appoint Dr. Scott and Mr. Williams a committee of two to draft such a telegram and send it to our President in the name of the Association.

The next order of business is the reports of committees and I think we usually hear first from the Committee on Fastness to Light. Mr. Cady.

. . . William H. Cady presented the report of the Committee on Light Fastness. . . .

Report of the Committee on Light Fastness

Submitted by William H. Cady, Chairman

During the past summer and fall your Committee has been conducting an elaborate series of light exposures at the Bureau of Standards, Washington, under the direction of William D. Appel. These exposures are in a sense a continuation of those made during the summer of 1925 and reported on at the last annual meeting; but while the latter were limited to only twenty dyed samples, the series now in progress comprises 1,047 distinct dyeings, each subdivided into nine pieces, so that all of the 1,047 dyed samples will eventually have been exposed in nine different ways. The dyes used in the preparation of these samples include practically all of the important dyes now in use, and are divided about equally between cotton, wool and silk. In the preparation of these dyeings we have had the co-operation of the laboratories of the following sixteen companies: American Printing Company, American Woolen Company, Arlington Mills, Calco Chemical Company, Cheney Brothers, Ciba Company, E. I. du Pont de Nemours & Co., Geigy Company, General Dyestuff Corporation, Mount Hope Finishing Company, National Aniline & Chemical Company, National Silk Dyeing Company, Newport Chemical Works, Oriental Silk

Printing Company, Pacific Mills and U. S. Testing Company. The fabrics used for the dyeings were: bleached cotton cloth, plain weave, weighing 3 ounces to the yard; half-blood worsted cloth, plain weave, weighing 8 ounces to the yard; and "Cinderella" silk cloth.

All of the dyeings were originally 18 x 7½ inches in size. They were assembled at the Pacific Mills, cut up into the proper sizes for the exposures, and forwarded to Washington. Mr. Appel will describe in detail the treatment of the samples from this point on.

The purpose of these experiments has been fully set forth in the report of this Committee appearing in the Year Book just published, and is probably familiar to most of those present. While many of the exposures are already completed, some of the fastest dyes are requiring more time for fading than we had anticipated, consequently it would be quite impossible at this time to make a complete report of the results obtained. As a matter of fact, even after the fading is done it will take weeks of study, careful comparison and tabulation before we shall be in a position to publish a detailed report of this investigation. In the meantime, we are obliged to ask your indulgence.

Your Committee owes a debt of gratitude to the sixteen organizations which collaborated in the preparation of the dyed samples, and in particular to the officials of the Bureau of Standards who have co-operated with us in every possible way to make these experiments a success. In closing we cannot speak too highly of the work of Mr. Appel in conducting the actual exposures. In designing the fading cabinets, supervising the mounting of the samples, scrutinizing the progress of the fading from day to day, and finally in recording the results systematically, he has handled all the details with tremendous energy and scrupulous care. The final report will be published as a joint production of the Bureau of Standards and our Association.

Chairman Killheffer—Mr. Cady, is there some further detail of that report to be given by Mr. Appel?

Mr. Cady—Yes.

Chairman Killheffer—Mr. Appel!

Further Report on Light Fastness Tests

Submitted by William D. Appel of the Bureau of Standards

The membership of the Association has a direct interest in these light exposure tests because they are an Association activity. Mr. Cady has indicated that further study of the samples is necessary before the report on the tests is ready for publication. However, a preliminary account may be given at this time of, first, how the tests were made; second, how the results are being studied; third, some general results subject, of course, to verification and revision as our study progresses; and fourth, some observations on peculiarities in behavior.

As to how the tests were made; first, I shall talk about the daylight exposures.

The dyeings having been made, sent to Mr. Cady, and under his direction cut up into pieces two and a half inches wide and six inches long, were sent to my laboratory. Samples from the same piece were all given the same serial number and then were assembled into duplicate sets containing one sample from each dyeing, each set being given a letter designating that set and indicating the particular type of exposure for that series of samples.

The samples were mounted on heavy black paper with wire staples, and the samples in each set were assembled in strips of twenty-five, each sample overlapping the preceding one so as to cover the left hand half of it. This gave us an unexposed region, and permitted the greatest number of samples to be exposed in a small space.

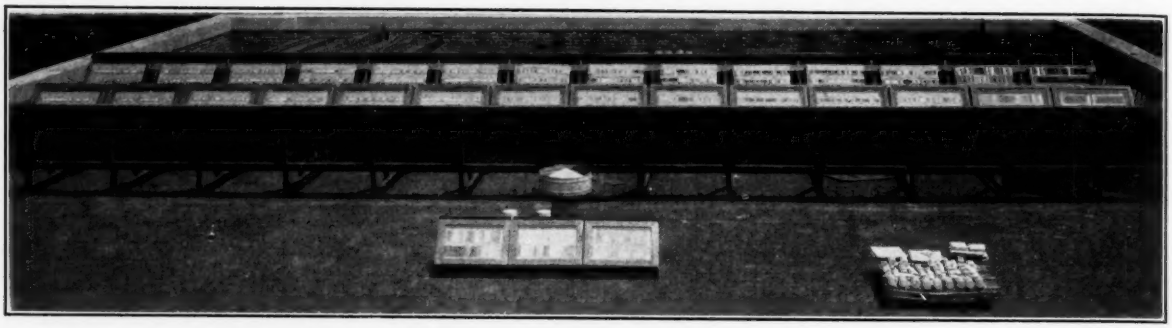
The samples were then fastened to our exposure boards, which measured 20 by 33½ inches, with thumb tacks. I have a photograph of one of the boards with the samples mounted on it.

The exposure racks were built on the roof of the Industrial Building at the Bureau of Standards and consisted of a wooden partition on which were blocks to hold the exposure boards. Over them were glazed hinged covers for the under-glass exposures. The covers had openings along the sides so that the air could circulate in through the box. The samples on the boards were a half-inch away from the glass, so that the air could circulate between the samples and the glass. One series of racks was in a vertical position facing south, one in a vertical position facing north, one at an angle of forty-five degrees from the horizontal facing south, and one without glass covers forty-five degrees facing south.

This photograph gives you a bird's-eye view of the set-up, and this nearer view shows the openings in the cases and also the way in which we covered our samples.

The glass used to cover the samples was ordinary good grade window glass, but it was purchased under a specification designed to give a glass uniform in chemical composition and of fairly uniform thickness. As a matter of fact, we bought sixty panes of glass and used forty-two, selecting those that were nearest together. They varied in thickness from .112 to .139 inches, and averaged 0.125 inches.

The spectral transmission of two samples of this glass, selected at random, was measured by the Colorimetry Section of the Bureau of Standards and is shown in this blueprint. The glass was transmitting the ultra-violet light out as far as wavelength 320; 70 per cent of the light at wavelength 350 was transmitted; then, of course, it falls off very rapidly from there on to 320, where only a few per cent were getting through. From there to 290, where



Exposure Racks for the South

the solar spectrum ends, ultra-violet light did not get through. You may be interested in that curve.

Exposure Methods

As to the exposures, we got our last samples near the middle of June and started off immediately with three sets, which were exposed only when the sun was shining, between nine o'clock and three o'clock. If clouds came up the samples were either covered or brought in. Set A was exposed at an angle of 45 degrees facing south under glass. Set B was exposed in exactly the same way, except that there was no glass cover. Set C was exposed in a vertical position under glass facing north. Set C has faded so slowly that we are nowhere near through with it, and it will not be reported on at this time.

We exposed the sample, the entire right-hand side of the sample, for six hours' sun, and then covered up the first quarter of it, an area measuring one and a quarter inches square, and we exposed for six hours longer. Then we brought the samples of the A set in and examined them. We separated those samples which showed a distinct fading in twelve hours of sun. We called them Group 1 and they were mounted together and the other samples were shifted along on the boards.

We eventually split our samples up among several groups in each set, depending on their fastness, Group 1 including the very fugitive dyes and Group 3 the faster ones. Group 1 was given exposures of 6, 12, 24 and 48 hours on the four quarters of the exposed area; Group 2 was exposed for 12, 24, 48 and 96 hours; Group 3 for 24, 48, 96 and 192 hours of sun, in the A set. The B set was exposed for exactly the same length of time so that a comparison of Set A with Set B will show what the glass has been doing in those exposures.

When it came to the C set, and D. E, and F, which I shall mention in a moment, the exposures were timed so as to have on the average the same fading quarter by quarter in the different groups as we had in the A set, so that we could make an inter-comparison between the individual samples.

The D, E, and F sets were exposed continuously. They were out regardless of the weather, rain or shine, and all night. The D set was in a vertical position facing south, under glass (they were all under glass, naturally; none of them were rained on). The E set was 45 degrees facing south; and F was vertical facing north. The D and F are very practical tests because in a way they simulate the conditions of curtains in south and north windows.

As to the actual time required by the different sets to produce the same average fading, I will pass this card around to show how a typical dyeing looked after exposure in the different sets. This is a Group 2 sample, so that it received 12, 24, 48 and 96 hours of sun in set A and in set B exposures. In set D, continuous, vertical south exposure, it received 4 days, 6.2 days, 14 days, and 32 days; in set E continuous, 45 degrees, it received 2.2 days, 4 days, 6.2 days, and 13 days; in set F continuous, vertical, north, it received 4.7 days, 11 days, 22 days, and 59 days exposure. These times gave the same fading in the different kinds of exposure in these particular experiments.

I might also speak of the Fade-Ometer exposures at this time. We used the Fade-Ometer as an example of the violet carbon arc and exposed two samples in the Fade-Ometer, the first one for periods corresponding to the first and second quarter of the sun test, and the second to the third and fourth quarter of the sun test. An exposure of 4 2/3 hours in the Fade-Ometer was taken to equal six hours of an exposure.

We will pass these samples around so you can see how they are mounted. I should like to say the reason for putting this tab on here is that we could then replace a sample over the covered area and always have the same sharp line of demarcation between the covered and the uncovered area; also, these tabs are always over a small part of the sample and in case there is any question as to the sample changing in handling or in exposure in the laboratory, we can take that little tab off and see whether that was true or not.

We made observations on the weather and temperature and humidity several times a day throughout the tests, and all that data will be given in the final report.

As to how the results are being studied, we have drawn up a table giving all the essential data—the name, the Colour Index number, manufacturer and dyeing strength and so on of the dyes.

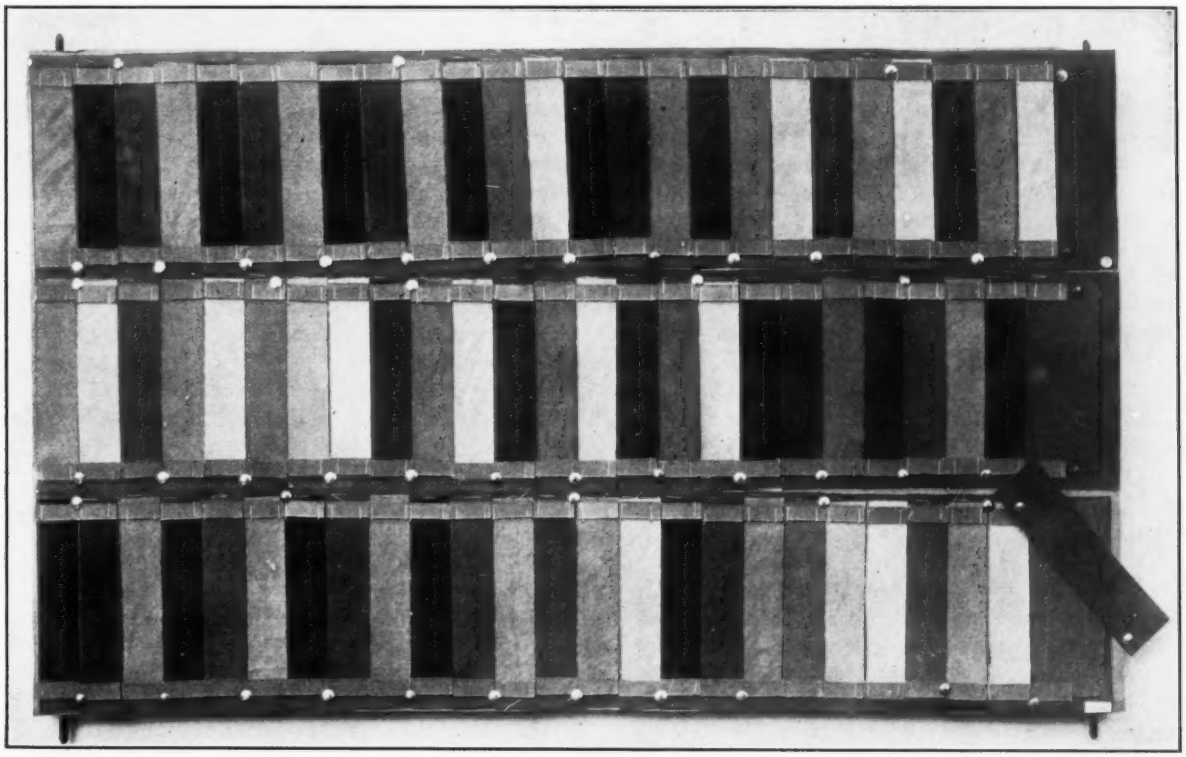
Rating of Faded Samples

We have made comparisons of each of these exposure sets, with Set A as standard. We have, of course, used the ordinary visual method of evaluation by comparison of samples. We made this comparison, first, when the samples were brought in. Then we repeated it later, and other members of the Committee have still to make these comparisons. The comparisons, of course, were made without reference to the particular dye under consideration and we have had in mind always the point of view of practical use. Two dyeings were considered to be faded to the same extent, even if one darkened and the other became paler, provided the color change was noticeable and objectionable to the same extent. The behavior in all four periods of exposure was considered and judgment based on the whole.

The samples were rated in the comparison as having faded less than, slightly less than, equal to, slightly more than, or more than the corresponding sample in Set A. The "slightly more than" and "slightly less than" categories are significant chiefly in showing the general trend of the fading. The "less than" and "more than" categories consist of samples which show a distinct, unquestionable divergence from the Set A sample and therefore require special consideration.

With reference to some of the results, as I have said (and I should like to emphasize this), they are subject to verification and revision as we continue to study them:

I should like to mention, first, the comparison of the conditions in these various types of exposure, and I will put a table on the blackboard giving the temperature and the humidity. We will have the maximum and minimum observed in each exposure. This table is for the first two groups, for A exposures 45 degrees under glass only when the sun was shining—maximum temperature 62 deg. Cent., pretty nearly enough to burn the samples (it was pretty hot out on the roof this summer); the minimum, 29; the relating humidity was 45 per cent maximum and less than 10 per cent minimum (the samples became very dry). In the B exposures, which were not under glass but otherwise were the same, the maximum temperature was 44 deg. Cent., 25 degrees minimum; humidity 72 per cent maximum and 22 per cent minimum. The humidity was higher and the temperature



Samples Mounted on Exposure Board

lower. That has had an influence on the fading of some samples.

I shall mention the E set next. That was exposed in the same way, 45 degrees under glass, but it was a continuous exposure. The temperature there went up to 72 deg. Cent. on our hottest day; the minimum temperature was 26; and there was almost 100 per cent maximum humidity (we had rainy days, of course) and less than 10 per cent minimum.

I shall just put down the F set, vertical, north, continuous. It was 43 degrees maximum temperature, 15 degrees minimum; 100 per cent maximum and 17 per cent minimum. The F set, I would speak of as a high humidity exposure, because facing north the temperature was low, and the average humidity was very much higher than in the other cases.

Results of Tests

I can give you an indication statistically as to how the samples behaved in these tests. We had a large number of samples and it is fair to draw statistical comparisons.

We will have here (illustrating on blackboard) the "less than" group ("L" meaning "less than"), the "slightly less than," the "equal," "slightly more than," and the "more than" categories of samples, all in comparison with Set A.

Seventy-five per cent of the Set B samples (exposed without glass) have faded to the same extent as the A samples under glass. The glass has made no appreciable difference in the fading of those samples; 12 per cent are slightly more faded in Set B, 3 per cent are very distinctly more faded, 8 per cent are slightly less faded. A matter of judgment comes in and these fluctuations given as slightly more than or slightly less than are not very marked. I think for ordinary purposes you would consider them faded to approximately the same extent, but that shows the trend.

One and one-half per cent of the B samples were very distinctly less faded without the glass than with the glass. I have some samples here to show you that there is no question about that. The only explanation I can see for it is that the high temperature has had something to do with it; the conditions are decidedly different; the temperature, you see, went up 20 degrees higher under the glass.

For the E set which was continuous, out day and night (but otherwise like Set A), the figures are 2.7 per cent less, 21 per cent slightly less, 62 per cent equal, 7½ per cent slightly more, and 7.1 per cent more, compared with Set A. There is pretty good agreement between the E set and the A set, but some fluctuations are evident.

In the F set, 35 per cent were distinctly less faded, compared with A, and 14 per cent decidedly more faded, 25 per cent equal, 21 per cent slightly less, 4 per cent slightly more. The F set has faded markedly different from the A set or the B set. The E set is more like A and B, but its fading shows some of the characteristics of the F set, starting off in that direction. The D set is very much more like the F; it is intermediate, but it is very much like the F. The A set and the F set are the two extremes in these tests.

The Fade-Ometer exposures naturally resemble the A and B sets much more nearly than any of these exposures because they were high temperature, low humidity, high intensity exposures.

There is one other point I should like to mention at this time that seems worth while. We analyzed the data for the F set with respect to the various chemical types of dye, the chemical classes of dye, and also the dyeing methods and the fiber. With respect to the fiber, here are the results. Thirty of the cotton samples were in the "less than" category; 44 slightly less; 64 equal; 20 slightly more; and 105 (that is, not per cent, but number of samples) were in the "more than" category. For wool, the figures were in the same order, 142, 61, 39, 5 and 4. For silk, 136, 15, 11, 3 and 8.

Obviously, the cotton dyeings behaved very differently from the wool and silk dyes in the north sky exposure—relative behavior.

With reference to those cotton dyeings we find that the basic dye types on tannin—triphenylmethane, azine, xanthene, etc.—are faded decidedly more, relative to other samples, in the north sky exposures (high humidity). That is also true of Indigoids. That is rather definite, and I can mention it at this time.

Peculiarities in behavior: I thought I might pass these around—these are some samples which have faded more under glass than without glass. Here are some that have faded more facing north than in the sun test, relative to other samples, of course. Here is another card showing the same behavior. Here are some which have faded less relative to other samples facing the north than in the sun test. The cotton samples don't all fade more relatively; there are some that behave just like wool and silk—they fade decidedly less than the average in the north exposure.

A year ago I said something at our meeting about dyeings which "fade" darker. We have many samples of that in these tests. Some of them are very striking. The acid triphenylmethane dyeings on wool show it very markedly. We find that a weak dyeing (this particular one is Patent Blue A) fades lighter and lighter and lighter, paler and paler and paler. The strong dyeing fades darker and darker until it is almost black. A dyeing of intermediate strength doesn't change so very rap-

idly until you get down to the fourth quarter and then it becomes paler.

Other samples show that on more prolonged exposures these that go dark, even to black, will eventually start to become paler and probably will go very pale. That is not limited to triphenylmethane dyes. I have some other dyes which show it here. It is not limited to any particular colors, so far as I can see. This green is one which is beginning to fade lighter after it has faded darker.

I have put on some of these cards A samples and F samples, to show the difference in behavior. Here is an orange which goes very red in the sun exposure and doesn't change in the north sky exposure, relatively. Then we have others, practically the same color, which fade in just the opposite direction. They change in the north sky and don't change in the sun. Fade-Ometer samples are on here, too, for comparison.

Here is a comparison with sun, north sky, and Fade-Ometer. These cards were made up the day before I left and I wasn't able to label them all completely.

Hue Changes

There were two things we got into that I might mention. We found on examination of the samples that a good many of them showed a very marked hue change in the unexposed area, due to drying out in the sun exposures. That was a temporary change and when we brought the samples in and kept them in the laboratory for a while they reverted to their original color in the unexposed area. However, some of the dyeings didn't revert to their original color in their unexposed area, and I have a few samples of those here. The majority of these changed in the unexposed area in the sun test, but I have one sample where the change was in the north sky test, rather than the sun.

I can't say anything at the present time about the classification of these dyes. We have started a tentative classification, a fastness classification, and our tests being made simultaneously will lead eventually to a classification of the dyes. We have space for that in the table there and we have actually filled in a tentative classification, and have also data as to the difference in classification obtained by exposure facing north as compared to the sun exposures.

Of course, on difficulty that comes up in the classification is in connection with dyeings like these samples which show a color change in a short exposure and which don't change much more in still longer exposures.

I thank you. (Applause.)

Chairman Killheffer—I think you will have gathered from the report as you have listened to it that this is perhaps the most comprehensive study of light fastness that has ever been attempted. It surely will lead to some very valuable conclusions and has already led to quite a few. I am sure the Association is greatly indebted to its Committee on Light Fastness and to Mr. Appel and the Bureau of Standards.

There is a complete report of the Research Committee contained in the new Year Book. There is no particular purpose to be gained by reading that here, or repeating it. That is spread out there in full, for you to read.

I don't know whether there are any further reports to be made by some of the other subcommittees. Dr. Scott, have you anything further to report for the Silk Committee?

Report of Committee on Fastness of Silk

Submitted by Dr. Walter M. Scott

As Chairman of the Subcommittee on Silk, there is not very much to report with respect to fastness to washing. I believe that Mr. Appel will, a little later, present to you a special report on the tests which the Committee on Fastness to Washing, through Mr. Appel, have had made by various laboratories throughout the country.

In order to get some idea of the value of the standard methods which we devised for determining fastness to washing, we started a rather comprehensive series of tests, to see whether different laboratories could come to some agreement on standardization by following out our methods. I don't think I need say any more about that at the present time, but I simply want to call your attention to a few revisions which we made for the 1926 Year Book in the standard tests which we recommend for determining fastness to washing.

These changes have been made chiefly with reference to simplification of the process as much as possible. For instance, in the description of the test, we have eliminated the idea of removing the sample from the soap solution and squeezing during the test. Formerly, we provided for several squeezes of the sample during the washing test, but we made a number of tests in various laboratories and found that the actual loss in strength was very little different whether you removed the sample and squeezed it or whether you kept it immersed in the soap solution and stirred it. In fact, that difference is much less than the difference caused by changes in the temperature of the soap solution. When working at high temperatures the removal of the sample and subsequent replacement would cool the soap solution so that it was very hard to maintain an even temperature.

In the 1926 Year Book we have simply provided for keeping the sample immersed during the ten-minute period and stirring from time to time, to insure penetration of the sample.

We have also made a change in the percentage of soap

solution to be used. We have changed it from 1 per cent to one-half of 1 per cent. We found that the actual difference in loss of shade was practically negligible between 1 per cent soap solution and a half per cent soap solution at the same temperature and under the same conditions. The reason for making this change was that we found it very hard to keep a 1 per cent soap solution in the low temperature test from coagulating or becoming solidified during the test. We had better results with the half per cent soap solution.

In the classification of the various samples with respect to their fastness to washing, we have endeavored in the 1926 Year Book to draw a noticeable distinction between the classification of the fastness to washing of dyestuffs on silk as contrasted with fastness to washing of dyed silk. Our conception is that the fastness to washing of dyestuffs on silk is a classification of the dyestuff itself applied to silk fiber. Such classification is really only of value as between the dyestuff manufacturer and the textile manufacturer. On the other hand, the classification of the fastness to washing of dyed silk is of value as between the dyer or textile man and the consuming public.

The latter classification does not need to be as complex as the former, because the public are really, in the final analysis, only interested in whether the material which they obtain is washable or not. They are not particularly interested in various types of fastness with respect to washing. So that in the latter classification we have reduced the number of classes to three, Class 1 being called Wash-Fast, which shows no appreciable alteration in color or straining of adjacent fibers or fabrics, after Test No. 2, which is 10 minutes' soap at 160 deg. Fahr.; Class 2, which we term Washable, showing no appreciable alteration in color or staining of adjacent fibers or fabrics after Test No. 3, which is 10 minutes at 120 deg. Fahr.; and Class 3, which we term Commercial, which will show noticeable alteration in color in the 120 deg. Fahr. test.

We hope by this change that we are coming nearer to conditions which will be satisfactory to everybody concerned.

Chairman Killheffer—Mr. Moran, have you any further report to make in connection with dyed and printed cottons?

Report of Committee on Dyed and Printed Cotton

Submitted by Subcommittee Chairman GEORGE A. MORAN

I shall have to report for the Subcommittee on Fastness to Washing of Dyed or Printed Cotton much along the same line that Dr. Scott has reported regarding silk.

During the past year it was deemed advisable to give the methods as already adopted a more thorough tryout by submitting them to various testing laboratories to determine whether in the hands of various operators working in different laboratories concordant results would be obtained, whether they would generally agree in their classification of the fastness of a series of dyed fabrics when following the instructions as laid out, and whether they had any criticism to offer as to the general procedure for making the tests.

Dyeings of various types of dyestuffs, including vat, sulphur, direct, developed, and basic, were made and submitted through the Bureau of Standards to ten testing laboratories, representing textile, dyeing, public and consuming interests, with the request that they carry through the fastness to washing tests according to the official procedure of the society; that they classify the fastness of the dyed fabrics according to their best judgment; and further that they report their opinions and criticisms of the procedure and the methods as they now stand.

The reports from these testing laboratories varied widely with reference to the classification of the dyed fabrics tested. There was general agreement with regard to the extremely fast and the extremely fugitive dyestuffs, but on those of intermediate fastness, there was wide divergence of opinion. This was probably due to the difference in interpretation of what constituted no change or but slight change in shade rather than to actual difference in the washing results.

TESTS TOO COMPLICATED

The criticism was also rather general that the tests were too long and complicated, and strong desire was expressed that the tests be made as short and compact as possible in order that a large number of tests might be carried through without undue expense or delay.

The results of these tests show that the methods of classification must be more accurately defined than at present, so that there may be a definite understanding of exactly the amount of change allowable under a given test. The tests must also be simplified as far as possible without defeating their purpose.

The fastness tests for cotton as carried out by these testing laboratories were not as printed in the 1925 Year Book; they were carried out in accordance with a revised form which differed but little in substance but was entirely different in the form in which it was worded. This revised form appears in the 1926 Year Book.

During the year, correspondence was entered into with the British Society of Dyers and Colorists with a view to securing their co-operation in the adoption of fastness

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tests. They have expressed a willingness and desire to work along with us in co-operation with other foreign societies in developing a general scheme that may become international in its scope. At present, the British Society has under examination the various fastness tests that we have already adopted and we expect to hear from them in the course of the next year as to their criticisms and suggestions.

Chairman Killheffer—Mr. Christison, have you anything further to report for your Subcommittee?

Hugh Christison—I think all I can say is in the Year Book. It is hardly worth while reading it at this time.

Chairman Killheffer—Mr. Moorhouse, has your Subcommittee anything further to report?

Wm. R. Moorhouse—We have nothing further to report than what is in the Year Book already.

I would like to say this, though: that we are open to criticisms. Under the heading of conditions where the material might be exposed to acids, ammonium fumes is mentioned as one of the acids. That has been published for three years and no one has called it to our attention.

Chairman Killheffer—That is one point that has been emphasized, I think, at most of our annual meetings: that the Research Committee, through its subcommittees, is doing a great deal of detail work, to work out these methods and make them generally applicable and useful, and they invite comments from the membership at large. Those comments can be either constructive or destructive.

Numerical Order Discussed

Alan A. Claflin—I don't know whether this criticism has been made before and ruled against, or not, but I notice in Dr. Scott's classification of fastness he has the first class No. 1, the second class No. 2, and the third class No. 3. In that connection, I think they are following the English custom, which is to have the highest order No. 1. But I think it is generally conceded that the German arrangement in that connection is better; they give increasing fastness and superiority the higher numbers.

So that as dyestuffs generally improve, instead of having a class Sub-1, as you would have to have this way, you will have Class No. 4 for dyestuffs that are superior to the present Class No. 3.

I think that the Association would do well to consider that numerical order rather than the present arrangement, because you know, on the question of light fastness, where the Germans originally went from 1, 2, 3, 4 to 5, they now have 6, 7 and 8 in fastness to light. That is very easy to understand. On the other hand, with the English system, when they get colors that are faster than their present No. 1, what are they going to call them?

Chairman Killheffer—I think that introduces a very interesting point. That subject has been considered a number of times by the Research Committee, and I am sure they will be glad to make note of that criticism and give it further consideration.

Of course, on points just like that, it is hoped that by getting in communication with the various foreign societies or other bodies who are investigating the same subjects, there will be brought about a gradual agreement as to classification and the way of expressing those classifications.

William D. Appel—In the light exposure tests, we used that system. Class 1 is the most fugitive, and our Class 6 is as high as we have gone up to the present time. Our samples are not all through fading yet. We have 125 or so which are very fast and we have to continue exposures, and we had to have a system by which we could increase the number of classes easily, if we wanted to.

Chairman Killheffer—That bears out Mr. Claflin's point.

Mr. Appel—I failed to state that in this series we exposed the German Fastness Commission's standards (or as near as we could come to them), also the British Silk Association's standards, and they are being studied in this collection of dyes.

Report on Washing Tests

Chairman Killheffer—Are there any other subcommittee reports to be made at this time?

Dr. Scott—Mr. Chairman, I don't know whether this would come under the heading of subcommittee reports, but we have referred already to Mr. Appel's report. He has another report to give with respect to washing, the reports of his laboratories.

Chairman Killheffer—I think we had better have that right now.

Mr. Appel—That will take but a minute. It has already been referred to, I think, adequately.

Tests were made by ten laboratories chosen to represent different points of view. They made washing tests of duplicate sets of samples according to the Association's methods and according to their own methods, and gave us the benefit of their criticisms and suggestions.

The first thing we wanted to find out about was reproducibility in the washing procedure. The reproducibility in the washing procedure can be judged by comparing the washed samples returned by the different laboratories. Did they fade to the same extent in the different handlings they received? A visual comparison of these samples shows very good agreement, and it is believed that no important differences in the classification arrived

at by the different laboratories can be attributed to actual differences in the washed samples.

The variations in classification in a few cases were very marked. So that reproducibility in judging the samples was not so satisfactory. In fact, in one or two cases samples were placed in the highest class by one laboratory and in the lowest class by another laboratory, the reason, of course, being that they followed the written instructions very exactly and allowed no leeway whatever for their personal judgment in the matter. In fact, as I mentioned in connection with the light exposure tests, samples that show a slight change in a severe test may also show a slight change in a mild test. A little superficial dye comes off and they do change, but the change is no more in the one case than in the other, or very little more, and those dyes might be put in the bottom class, if you strictly consider whether there has been a change in color or not, or they might be put in the highest class, if in your judgment the change is unimportant.

We have here page after page of suggestions and criticisms with regard to the tests. I shall not read them. They are being given the attention of the various subcommittees and I think by the time the next Year Book comes out sometiming definite will have been arrived at in the way of striking a happy medium in these tests.

Discussion of Classification

Chairman Killheffer—If there are no further reports of subcommittees to be made at this time, are the tellers ready to report on the result of the election?

P. J. Wood—Mr. Chairman, before you go on to the next subject, I should like to offer a suggestion to Mr. Appel regarding this classification, which would sort of picturize the method of exposure, without having to refer to a key.

You see, A, B, C, D, E, and F don't represent very much unless you have the key right by you; you must always have the key to which to refer. Whereas, I believe that if some such method as this could be adopted (illustrating on blackboard) it would give you a picture of exactly the method in which the goods have been exposed. For instance, a vertical position facing south could be represented by this line; a vertical position facing north by this line; 45 degrees south by this line; 45 degrees north by this line.

You may say, "Well, there are other subdivisions that cannot be represented."

Well, for exposures under glass we could use a double line. Of course, here you would have to have some other sign to represent north and south. But that can easily be done.

This could represent (illustrating) 45 degrees under glass, for instance, continuous. Intermittent could be represented by the same thing with an "I."

That, it seems to me, would give you a better picture of the method than the letter would give, in which case you have to refer to a key.

I don't know whether that suggestion has much value to it, but I think if you can get a symbol which gives you a picture of the method, it is a great deal better than having to refer to a key, because every time you say, "This is a resumé of what happened in the case of Classification F," you don't know what F is until you look back to Page so-and-so and find out. For instance, what is F?

Mr. Appel—Of course, the letter system was used in labeling because we could write it on the typewriter, but now when we represent those things I believe that we may be able to use a short word, which will give you the key to the situation; for instance, "sun glass," or "sun g." or "sun with g."

Mr. Wood—How would you represent 45 degrees? I think it would be much better if you could use a symbol of some sort.

Mr. Appel—It seems to me if you use symbols you will have to refer to the key for the symbols, just the same.

Mr. Wood—What I am getting at is that you won't have to have the key with you always. It is just like we know that Na_2SO_4 is Glauber salt. (Laughter.)

Chairman Killheffer—Are there any further suggestions or criticisms of a similar nature?

Dr. Joseph F. X. Haro'd—I don't wish to say anything that might seem to show a lack of appreciation for the immense amount of work that has been done by the various committees, but I should like to plead for what might be called the poor man's silk. I wish that some work might be done on weighted silk, such as the British Silk Association has done. In their reports on the fastness of some hundred colors to washing, to sun test, and to perspiration test, they include weighted as well as unweighted silk. This demand would seem to be congruous when it is remembered that tests on the alizarine and the basic dyes involve the application of metal to the fiber as well. I should like to register a distinct demand for the future that these tests be extended as the British Association has done to the determining of the fastness factors of weighted silk.

I should also like to commend Dr. Scott's committee for reducing the soap solution from 1 per cent to a half per cent, and ask them to extend the good work even further. The maximum detergent effect of soap is not obtained at high concentrations. The maximum fading effect may be obtained at high concentrations, but I should think there would be no purpose in using soap, in any case on a textile fiber, and especially a colored textile fiber, beyond its maximum detergent effect. A quarter

per cent soap solution has as high a detergent effect as a half per cent. On that account, there is no use using any greater amount. I should like to ask the Committee to give some consideration as to whether this wouldn't be a wise move.

Then I should also like to ask the various committees whether there has been any test in the use of the cotton goods as to the absence, the complete absence, of oxycellulose, which plays a distinct part in the reduction of color; also, whether there has been any connection between the fading or the darkening of the color on exposure to light that can be attributed to an impurity of the dye. In other words, have the dyestuffs employed in all these been definitely identified, showed to be free from unremoved intermediate, and to be free from associated dyestuffs added for the purposes of shading?

Chairman Killheffer—Those are matters for the further consideration of the Research Committee, unless any of the chairmen of the subcommittee would like to make some sort of reply right now.

Election of Officers

Are there any further comments on the reports of those various subcommittees? If not, we will have the report of the tellers at this time.

Mr. Johnson—Mr. Chairman, the ballots of the election for 1927 were cast as follows:

President—L. A. Olney	237 votes
Vice-President—Dr. E. H. Killheffer	236 votes
Vice-President—W. S. Williams	237 votes
Vice-President—Charles H. Sloane	1 vote
Secretary—Walter E. Hadley	237 votes
Treasurer—Winthrop C. Durfee	237 votes
Councillor for three years:	
George A. Moran	233 votes
H. Christison	233 votes
R. W. Arrington	13 votes

Chairman Killheffer—You have heard the report of the tellers, which shows the election of Professor Olney, our present President, for another term, which I am sure is very gratifying to all of us (applause); Vice-Presidents, Mr. Walter S. Williams and myself (applause); for Secretary, Mr. Walter E. Hadley (applause); for Treasurer, Mr. Winthrop C. Durfee, who is represented here to-day by his son (applause); and as Councillors, Mr. George A. Moran, who is re-elected, and Mr. Hugh Christison. (Applause.)

Discussion of Proposed Amendment

I believe the next order of business is the consideration of an amendment that has been proposed, signed by the required ten members, which has been reported to the Council as required by the Constitution, and also published in this program as further required by the Constitution. I will ask the Secretary to please read the proposed amendment.

. . . Secretary Hadley read the proposed amendment to Article VIII as follows:

Proposed Amendment to Article VIII

The following amendment has been proposed to the Constitution, same having been presented in writing to the Secretary, for presentation to the Council, at least four weeks prior to the Annual Meeting, such procedure being in accordance with the Constitution:

Third Paragraph, omit the words from "Excepting the first election" to "at least ten nominating ballots," and substitute the following:

Not later than July 1 in each year each Section shall elect one of its members to serve on a committee to prepare nominations for the annual election. The local secretaries shall send the names of their respective committee members to the Secretary of the Association, who shall serve as Chairman of the Committee without vote. The Committee shall publish in the "Proceedings" of the Association between October 1 and October 15, at least one nomination for each officer and at least two nominations for Councilor. Counter nominations for any office, signed by at least ten members, may be filed with the Secretary not later than November 1. The Secretary shall then prepare and issue an official ballot containing the names of all the nominees.

The following members have signed the proposed amendment in accordance with the Constitution: W. R. Moorhouse, W. H. Cady, W. M. Scott, L. A. Olney, W. S. Williams, R. F. Culver, E. H. Killheffer, R. E. Rose, Hugh Christison, Winthrop C. Durfee, R. W. Hook, G. A. Moran.

Chairman Killheffer—Mr. Cady, would you like to explain the purpose behind this proposed amendment?

W. H. Cady—Mr. Chairman and Gentlemen: As I am perhaps responsible for this amendment, I should like to say a word or two in explanation of it.

I think you will remember that the Constitution provides that eight weeks before the annual meeting each year every member is to receive a blank nominating ballot on which he is expected to record his choice for all the officers and for two councilors. But in the beginning, at the first meeting in Boston five years ago, when we had no constitution, a nominating committee was appointed by the Chair to select officers and councilors for the Association. This nominating committee must have done its work moderately well because during the five years that the Association has existed there have been very few

changes in the personnel of officers and councilors; with the exception of three changes due to deaths and resignations there have been, in fact, practically no changes made.

Of course, this happy condition could not go on indefinitely, and the break came this year when owing to the death of Vice-President Livermore and the request of Professor Olney that he be permitted to retire two vacancies occurred at the very top of the ticket.

It was rather interesting to note the reaction of the membership at large in this emergency. We may divide all our members for voting purposes into five general classes. In the first place, there is the very large class composed of those who don't vote at all; in the second class there are those who invariably vote for the officers of the preceding year, if they can find the list (laughter); the third class includes those who have no ideas of their own on the subject of voting and who call upon some friend who perhaps may know a little more about the politics of the organization and who will tell them how to vote; the fourth class is made up of those who put down the first name that comes into their heads, regardless of fitness, or availability, or anything else; the fifth class consists of those who really seriously consider the matter and discuss it with their friends and try to make a systematic effort to vote for someone who has a chance of getting on the official ballot.

To show that the membership is divided pretty well between these classes, I will give you the result of the nominating ballot this year. For President, five men received ten or more ballots, enough to put them on the official ballot; fourteen others received scattering votes. For Vice-President, eleven men received ten or more votes, and twenty-five others received a scattering vote. We will pass over the Secretary and Treasurer. For the Council, seven men received ten or more ballots and fifty-one others received scattering votes, and of the seven who received ten or more ballots, two were already members of the Council who will not retire for at least another year.

Of course, it must be obvious that a ballot containing five candidates for President and eleven candidates for the two Vice-Presidents' offices is out of the question, and, of course, as might be expected, those who received these nominations began to fall over each other to get off the ticket so as to reduce it to a normal size, and before the stampede was over all of the candidates for President had retired from the ticket with the exception of Professor Olney, who had been prevailed upon to withdraw his expressed wish to retire. For the offices of Vice-President, out of the eleven candidates nine withdrew, leaving just two for the two vacancies. For the Council, all but two also withdrew.

So that the net result of the direct primaries, as you might call them, was exactly one candidate for each office.

That brings up the second point. If we are ever to have another election like this, with so many candidates, there ought to be some more logical means of reducing the number without the danger of eliminating some of the more desirable candidates. So long as it is left to the individual nominee to get off or stay on, a good deal depends on his individual feelings in the matter. Those individuals who have the greatest inferiority complex will probably be the first to withdraw. But that doesn't mean that they might not be the most desirable candidates, in the long run.

A nominating committee such as we propose, it seems to me, would handle this matter in a much more sensible manner. It would eliminate the candidates one after another and finally get down to perhaps two who would be in their judgment the best choice, and in most cases probably only one.

Incidentally, the Association would be saved approximately $50 a year in the expense of getting out this direct primary ballot, not to mention the labor which it involves on the part of the Secretary.

So far as the Nominating Committee itself is concerned, this is what is proposed: that each section some time in the late spring elect one of its own members to serve on this Committee. These members will be called together or at least notified to meet or to correspond in some manner, which will have to be left to them, with the Secretary of the Association who will be ex-officio member of the Committee, without a vote. The Nominating Committee will have all summer, up to the first of October, I think, to carry on its deliberations and prepare a ticket. This ticket will be published in the Proceedings at a certain particular time and then the members will have a chance to think it over, and if they don't like the selection all they will have to do is prepare counter-nominations, signed by ten members only, and those counter-nominations will receive just as much publicity and will be printed in exactly the same kind of type as the nominations of the Committee itself. So that at the election no one need feel that he has a grievance because the Nominating Committee hasn't done a good job.

It seems to me that by having the Nominating Committee elected one from each section, the question of sectionalism ought to be eliminated. The two Southern sections, for instance, having two out of the six

members of the Nominating Committee, ought not to complain that they are not adequately represented, because that is a much larger proportion than the total membership of the Southern sections would justify.

It may be that the amendment as drawn up is inadequate and I am sure that I would be the first to welcome any changes in it. I hope that there will be a thorough discussion of the matter before we put it to a vote. If there are any questions in regard to it I should be glad to answer them.

Chairman Killheffer—You have heard the reading of the proposed amendment and Mr. Cady has given us a very adequate explanation as to the purpose in proposing this amendment. If anyone has any comments to make, I am sure we will be glad to hear them.

Mr. Cady—I might add that there is nothing to prevent a section from instructing its representative how to vote at a meeting of the Committee.

Mr. Durfee—Mr. Chairman, it seems to me there is one word in this amendment that might be changed. We use the word "counter-nominations." That implies a sort of dispute. If we simply said "additional nominations," it might be better. The thing as it stands simply preserves all of our present privileges, and adds more; these extra nominations are really additional and not controversial.

L. E. Jackson—In reading over the amendment, there was just one thing that struck me that might be improved. I am offering this as a suggestion. There may be a good reason for following it and then there may not be. At any rate, this is the idea: instead of voting for one officer and two councilors, why not put a little opposition in there and nominate two officers and four councilors, or just twice as many for each office to be filled as there are on the ballot as provided here?

Chairman Killheffer—You mean, to make it obligatory for the Nominating Committee to nominate at least two, instead of one?

Mr. Jackson—Yes. Put some opposition in there.

Mr. Cady—Mr. Chairman, I think the advantage of keeping the amendment in its present form is this: that there are some offices for which it would not be desirable to have two candidates. I am sure no one would want to run against Mr. Hadley for Secretary or Mr. Durfee for Treasurer, and there would be no point in having two candidates put up for those offices. As the amendment reads at present, it says "at least one nomination," which gives the Committee an option to name two or even more candidates, if it so wishes.

A. P. Howes—Mr. Chairman, I should like to ask Mr. Cady what he thinks might be the result if each member of the Nominating Committee, being instructed by his local section (as would probably be the case) to propose a certain slate, suggested different people. In other words, you might have six different candidates for each office if the various representatives on the Nominating Committee were instructed that way by their respective sections. The Committee really can't get together, on account of geographical conditions, and fight that thing out. I don't know just how they would work it.

Mr. Cady—In that case, I think the Committee would report six candidates.

Chairman Killheffer—As Mr. Cady has stated, it is possible that even this proposed amendment may be found to be inadequate later on, and that it will have to be changed again, but the evil is a very real one at the present time and this amendment is an attempt to go along in the right way to remedy the situation.

I might say that in the case of the nominations that Mr. Cady mentioned, there was one man who was nominated for the office of President, Vice-President and Councilor, and there were several who were nominated for both Vice-President and Councilor.

It was thought that by passing this amendment and having a Nominating Committee representative of all the sections, we could perhaps do a better job than we are doing at the present time in the matter of nominations. That Committee will be required, of course, to nominate at least one for each office, but they can nominate just as many as they like.

Is there any further discussion on this subject?

Mr. Claflin—I move the amendment be accepted.

. . . The motion was regularly seconded. . . .

Chairman Killheffer—It has been moved and seconded that this amendment be passed by this meeting, which is the requirement of the Constitution, to a letter ballot of the Association. In view of the fact that we have in this gathering this morning a number of non-members and guests, it may be better to have a written ballot. It requires a two-thirds vote of this meeting to pass it to a letter ballot of the Association.

Mr. Secretary, will you please distribute these ballots and ask that only members accept them? It has been suggested also that you sign your name to the ballot.

. . . The ballots were distributed. Secretary Hadley and Mr. Howes were appointed to collect the ballots and count them. . . .

Chairman Killheffer—The Committee which was appointed earlier in the morning has retired to word the telegram to Professor Olney, and unless there is some other matter of business to come up, we will proceed with the presentation of the papers prepared for this session.

The first paper on our program is "Scouring, Dyeing and Bleaching of Cotton Which Has Been Treated With Oil Spray," by Professor A. H. Grimshaw. (Applause.)

Proceedings of the American Association of Textile Chemists and Colorists

Scouring, Bleaching and Dyeing Cotton Which Has Been Treated with Oil Spray

By Prof. A. H. Grimshaw
Textile School, North Carolina State College

I am more accustomed to addressing a group of young men with not so many bald spots or so many gray hairs. These younger men as a rule do not ask questions, but when I finish with this little talk I hope that you will all be willing to ask me any questions you see fit. As to whether I can answer them or not, I won't say; I will at least be willing to try.

At Burlington, N. C., last winter at the meeting of the Southern Section of the American Association of Textile Chemists and Colorists there was a lively discussion concerning the effect of oil spraying on cotton as regarded dyeing; this applied more especially to mineral oil spray.

At the suggestions of some who were present, it was decided to run some tests at the Textile School of North Carolina State Collect to secure data on this subject.

Textile chemists and dyers do not need to be reminded that tests as made in a lab are made under different conditions of quantities, methods and apparatus than the tests made in actual practice in the plant. However, the results of the tests made in our laboratory are passed on to you with the hope that they may prove of some benefit to you.

The Cotton Oiling Process

The oiling of cotton in the "spray" process is done on the raw fiber; usually at the bale breaker or at the picker. The object being to lubricate the cotton fiber to make it work better during the processes of carding and spinning. Whether or not the oil is of value in these processes does not interest us as dyers as much as does its effect on the dyeing qualities of the yarn and cloth.

Bleachers and dyers naturally have a dread of mineral oil as they know from experience of the great trouble caused by mineral oil stains (from lubrication of machinery) which has come in contact with the yarn or cloth. These straight mineral oil stains cannot be removed by saponification in alkali boils.

In a discussion held at the last Annual Meeting, in December, 1925, E. H. Hinckley, who is interested in the manufacture of one of these mineral oil compounds for spraying, stated that in their search for a suitable oil, his firm had tried many. Among the number was sulphonated oil, which is, of course, familiar to you all. As it is used in dyeing, you are familiar with its qualities. Because of its use in dyeing, we used it in our tests for comparative results. However, Mr. Hinckley said that sulphonated oil was not suitable for oil spraying because of its action on the card clothing.

This firm finally decided on a mineral oil compound of the emulsifiable type, claiming that a mineral oil is of much assistance in softening up waxes and fats on cotton fibers, and making them easier to remove in the scouring processes.

Chemists know that mineral oils are not saponifiable, and also know that emulsions are comparatively easy to remove in scouring. For instance, fresh milk is likely the most perfect emulsion of nature, and when spilled on cloth, it can be removed easily by use of a little warm water and soap. If a mineral oil compound is emulsifiable, then theoretically it should be easily removed in the scouring processes.

Dr. Richard B. Earle states that in the presence of oil on cotton fiber the cloth dyes a deeper shade, and if there is any inequality of distribution of oil on the fibers, the dyeings are bound to be uneven. In carding and spinning the mixing of the fibers tends to even up any irregularities of oiling. He found an increased depth of color and better penetration than with untreated fibers.

With kier boiler cloth, Dr. Earle said that no trouble need be apprehended if an easily emulsified mineral oil has been used in spraying.

Gray cloth dyeing as in the case of sulphur dyes, where the cloth is singed, diastafored, washed and dried, requires that the cloth shall have been treated with an oil that is emulsifiable with water alone. This is due to the fact that the cloth is not kier boiled or treated with caustics, but treated with water only.

With the foregoing as a basis it was decided to try the experiments on yarn that had been sprayed with various oils. As Dr. Earle stated that there is no danger in scouring and dyeing samples which have the oil uniformly sprayed thereon, the skeins were sprayed with the idea of having the oil unevenly applied. In this manner, it was hoped to show whether uneven spraying or distribution of the oil would interfere with the dyeing.

The method of applying the oil was to weigh out the skeins and apply the oil with a spray-gun until the skeins had gained 1 per cent (in one case, and 5 per cent in another) of the oil. Then the skeins were allowed to hang for a few days to allow for penetration.

Procedure of Test

The oils used were a straight mineral oil that was being used in the school for lubrication; a 50 per cent sulphonated oil; a sample of spraying oil that was given to the school about two years ago, and a sample of oil used in spraying cotton in one of the local mills. The last two were of the emulsifiable mineral oil class. The reason for using these last two was that we had been told the oil being used in the mill was of a better class, that

is, that it was more emulsifiable. The same firm made both, but had improved their compound since giving a sample to the school.

Scouring was done by two methods: a light scour by using an open kettle with .5 per cent each of soap and soda ash at a boil for an hour, and a kier scour using 1 per cent caustic soda with ten pounds pressure for two hours. All percentages are figured on weight of goods. The per cent of oil on the skeins in one case was 1 per cent as used in spraying formula; and in the other case was 5 per cent to give an excess of oil, to find the effect of having too much oil.

In scouring with the soap method the goods were well rinsed in hot water, but with the kier they were rinsed with cold water; these facts will be taken into consideration later.

After scouring, the skeins were bleached in bleaching powder solution of 1.5 deg. Tw.

After drying, skeins from each lot, excepting the straight mineral oil samples, were extracted with petrolic ether, and the accompanying chart shows the comparative amount of matter left. With the emulsifiable oils, this substance was when hot of a light yellowish color; upon cooling this oily substance congealed to form in about the same consistency as lard, but somewhat darker in color. The blank skeins congealed their extract to a more waxy whiter substance. The sulphonated oil extract was very similar to the emulsifiable oil extracts.

As shown by the chart, the sulphonated oil left less extract than did the other oils. In the case of the emulsifiable oils, those skeins which were scoured with soap and washed with *hot* water, left less extract than did the skeins which were kier boiled with caustic and washed with *cold* water. This led us to believe that there likely was some congealing of the oil because cooled down by the *cold* water, and in the congealed state it would be harder to remove than when liquid.

Dyeing tests were made by dyeing in one kettle twelve

Table of Results of Bleaching and Dyeing Appearance

Color—	Method of Dyeing	Method of Scouring	Old Oil	New Oil	Sulphonated Oil
Direct Red (1 per cent oil).....	Batch	Soap	Duller	Bright	Trifle
	Indiv.	Soap	Darker	Lighter	Duller
Direct Red (1 per cent oil).....	Batch	Kier	Darker	Lightest	Duller
	Indiv.	Kier	Dark	Same as	Same
Direct Red (5 per cent oil).....	Batch	Soap	Dullest	Bright	Duller
	Indiv.	Soap	Dullest	Bright	Dull
Direct Red (5 per cent oil).....	Batch	Kier	Dullest	Bright	Duller
	Indiv.	Kier	Dullest	Same as	Same
Sulphur Blue (1 per cent oil).....	Batch	Soap	Streak	Darker than	....
	Batch	Kier	Darkest	Darker than	....
Sulphur Blue (5 per cent oil).....	Batch	Soap	Dark	Darker than	....
	Batch	Kier	Dark	Same as	....
Direct Blue (1 per cent oil).....	Batch	Soap	Same	Same	Same
	Indiv.	Soap	Same	Same	Same
Direct Blue (1 per cent oil).....	Batch	Kier	Same	Same	Same
	Indiv.	Kier	Same	Same	Same
Direct Blue (5 per cent oil).....	Batch	Soap	Same	Same	Same
	Indiv.	Soap	Same	Same	Same
Direct Blue (5 per cent oil).....	Batch	Kier	Same	Same	Same
	Indiv.	Kier	Same	Same	Same
Bleached Skeins					
One per cent oil		Soap	Poorest	Whitest	Next
		Kier	Poorest	Good	Good
Five per cent oil		Soap	Poor	Whitest	Next
		Kier	Poor	Next to	....

different samples using 1 per cent Newport Fast Scarlet 4BS in one case and 1 per cent Chlorantine Fast Blue 2GL in the other. Salt was used, but no ash. The same dyes were used to dye in individual baths of 1 per cent. Another set of skeins were dyed in one bath using 5 per cent Sulfogene Navy Blue RL Conc. We also dyed some straight mineral oil sprayed skeins with Direct Red, but as it stained in usual manner, did not bother any further with it.

These samples are here and you can look them over as to evenness and depth of color. The table has been prepared with remarks of appearance as they seemed to us. The Direct Blue that was batch dyed appears to have all skeins fairly uniform; this also applies to the Direct Blue for individual baths. With the Direct Red, the old oil spray gave inferior results; the new oil spray gave brighter results; especially noticeable in batch dyeing samples where the other samples seem dull.

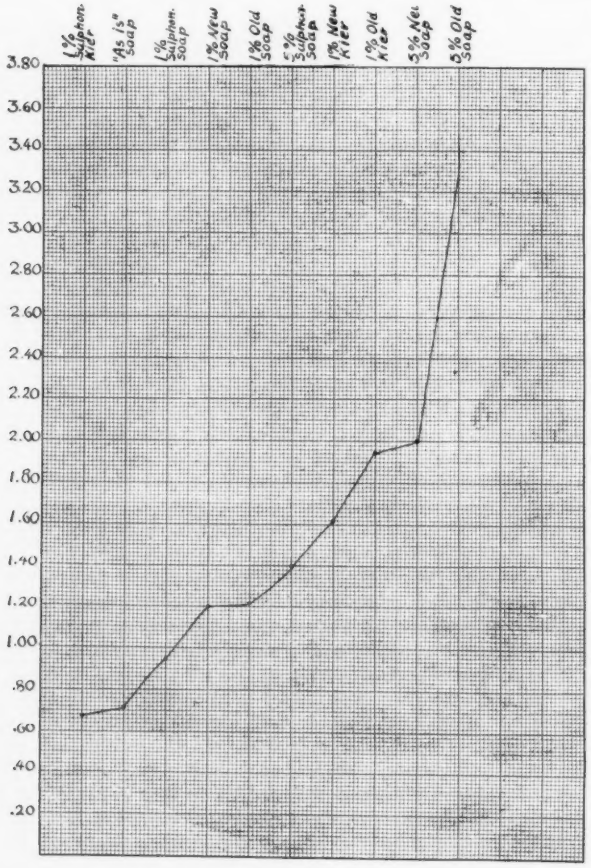
With the sulphur dyeing, the old spray gave inferior results; the new spray gave very slightly darker color than the sulphonated oil.

With the bleached skeins you will notice that the new spray with the soap scour and hot water wash, gives a trifle whiter bleach, although that from sulphonated oil is almost as white. The old spray oil is a darker bleach.

With the kier scour and *cold* water wash, the sulphonated oil bleached samples are whitest, with the new spray oil being almost as good and the oil spray oil is once more the poorest.

The hot and cold water washes interested us, so we tried a few rough tests to find out how well the emulsifiable oils would emulsify. Using hot water and a little soda ash, the new spray oil formed the best emulsion which took longer to separate. The old oil spray broke after standing, to form three layers, so that likely accounts for its poorer showing.

From these tests run at our school it would seem that oil sprayed cotton, that is, sprayed with an emulsifiable mineral oil, will give as uniform results in dyeing and bleaching as can be obtained by using sulphonated oils. As to its after effects, we have not as yet run any tests, so cannot say whether or not the bleached white will eventually yellow.



Each Space Equa's 0.2 Per Cent Matter Extracted with Petrolic Ether

Discussion of Oil Spraying

Chairman Killheffer—This is an interesting paper. It is work along a very interesting line and I am sure Professor Grimshaw would like to hear any discussion that you might wish to engage in.

Mr. Ullman—I would like to ask Professor Grimshaw one question: He spoke of preparing the goods before entering into the kier by giving a cold water wash. That does not correspond exactly to the way in which all bleacheries handle the goods before putting them into the kier. Some of them treat the goods with a dilute solution of sulphuric acid. I wonder what effect that would have on this oil, whether it would then be removed in the kier?

Professor Grimshaw—I haven't happened to run any of those tests, Mr. Ullman. Of course, some cloths are diastafored, or they are steeped, and so forth. This yarn was not a warp yarn; it was a filling yarn, made right there in the school, 3 26's, and had no sizing material on it at all. When I said that we wet it out with cold water, I meant you to understand that it was in the washing afterwards when I used the cold water, instead of washing with hot as it came out of the kier. They were all wet out with warm water before they were put in.

George A. Moran—You made this comparison with sulphonated oil. You did not make any comparison with yarn that had not been treated with any oil, did you?

Professor Grimshaw—In the bleached skeins that have been passed around, you will find one skein which was soaped and bleached without having been treated with anything at all. That came second in the extraction. The one that had sulphonated oil came .68 per cent and that came about .72 per cent of extractable matter.

L. L. Bamberger—I believe Dr. Grimshaw's results would have been somewhat different, especially as regards the uneven application of oil, if they had been done on piece goods. I believe Dr. Earle's opinions were based entirely on the piece goods standpoint.

As large dyers of Sulphur Khakis, we were very much worried when we heard of this spraying process, and on the first of it that we got we had some trouble which was due altogether to the fact that the spraying was done, I believe, with a single-acting pump and went on unevenly. With each stroke of the pump maybe a large shot of oil would be put on, and on the back stroke the raw stock would get by without any oil at all; on subsequent operations this wasn't evenly distributed in carding and spinning, and we got the uneven results that we had feared. But later on when the spraying became uniform we had absolutely no trouble at all on that score. In fact, provided the oil is put on uniformly and is very emulsifiable, I believe I can say that we get better results even on dyeing from the bale, which is the hardest type of piece goods dyeing on which to secure uniformity, and the results will be superior to unsprayed cotton.

Professor Grimshaw—Mr. Bamberger brings up the point about cloth. I am mighty sorry that we did not have the opportunity at the school to do cloth. We should have liked to use the raw stock that had been sprayed and the cloth also. Those of you who go to school know that besides doing these little tests we have to do quite a lot of teaching, and my time is pretty well taken up. I might say that in this time we have dyed around two or three hundred skeins. A lot of them were given individual attention; individual baths were given to a lot of these skeins that I have here. It took up considerable time and therefore I didn't get a chance to do the cloth.

Mr. Bamberger—The point in connection with the yarn is that on dyeing the yarn with a very large volume of liquor in proportion to the amount of cloth, any unevenness would have a tendency to be overcome. On the other hand, in dyeing Sulphur Khakis on a continuous machine, which is practically mechanical dyeing, in very strong baths, the cloth being in contact with the liquor practically to a fraction of a minute or a few seconds, those differences become very marked.

The fear of unevenness from oil spraying on cloth treated in that way was very real, but as it happened the mechanical process has improved to such an extent that it has become an advantage instead of a disadvantage.

Professor Grimshaw—In making our tests, we tried, as I said, making one with a half per cent soap and a half per cent soda ash for an hour at a boil in an open kettle, as well as the kier boil. We wanted to have a light scour, then the kier boil, and when you see the bleached samples you will find they are better than the kier samples, which received more severe treatment.

Chairman Killheffer—Is there any further discussion on this paper? If not, we will pass on to the next paper which is on the subject, "Difficulties Encountered in Dry Cleansing Textile Fabrics," by L. E. Jackson, of the Mellon Institute. (Applause.)

L. E. Jackson—I also have some samples here that I wish to present a little later.

Before I start reading this paper I want to say there is a spirit in this organization that appeals to me very much, and that is that all the papers and discussions seem to be presented for the purpose of improving textiles and the methods of handling textiles. It is with that same spirit that I present this paper. I am connected with a group of dry cleaners who maintain a fellowship in the Mellon Institute. We have direct contact with the consumer of textiles, and it is some of the textile problems that are presented to us, and submitted to me in my laboratory, that I want to call to your attention this morning.

. . . Mr. Jackson presented his prepared paper:

Textile Defects Encountered in Dry Cleaning

By Lloyd E. Jackson

Senior Industrial Fellow, Mellon Institute of Industrial Research, University of Pittsburgh

Dry cleaning is the removal of dirt and stains from materials by means of organic solvents and of especially prepared soap. The process is also known as French or commercial cleaning. It is based on the fact that a considerable amount of dirt and dust on wearing apparel, draperies, etc., is held in position by greasy substances. After the grease is removed by a suitable solvent, the dirt may be taken away mechanically. The process involves immersing the articles in liquids other than water, which do not affect the physical properties of the materials treated. In the strictest sense, the process is not dry, but, on the other hand, articles immersed in the liquids employed in dry cleaning are not wetted as they would be in water. Water causes textiles to become limp and in many cases to alter in shape and size. Petroleum naphtha and other organic liquids employed in dry cleaning do not induce such alterations in textiles.

Articles which may best be dry cleaned include clothing, millinery and housefurnishings. Materials that are sent for dry cleaning include textiles made from almost

all known fibers as well as leather, fur and feathers. The textile fibers encountered are for the most part wool, silk, rayon, cotton and linen. Of these, wool, silk and rayon predominate.

The articles received for dry cleaning are sorted and classified as they come into the plant, first as to material, then as to strength or sturdiness, and finally as to color. As far as it is possible materials of the same kind are cleaned together. The more durable materials in the form of wearing apparel, draperies, etc., are cleaned in a revolving cylinder washer. Several baths of petroleum naphtha and dry-cleaning soap and two or three rinses in clean naphtha are required for the best results in practice. Delicate materials such as chiffon evening dresses and articles too bulky for machine cleaning, such as furniture, are cleaned by hand with petroleum naphtha and dry-cleaning soap. Much of the success of the cleaning process depends upon the dry-cleaning soap used. A good dry-cleaning soap is essential for proper cleaning. When possible after cleaning the articles are extracted and dried either in tumblers or in well-ventilated drying rooms. When dry they are inspected for spots, which are removed by specialists. Finally, articles which can be pressed are so treated before being returned to the customer. The whole cleaning process is characterized by the use of cleaning agents and detergents that are inert with respect to the materials to be cleaned. The process briefly described seems simple and one that should offer few difficulties. Nevertheless the modern dry-cleaner has many problems.

Textile Defects Encountered

One unavoidable source of difficulty is the natural wearing out of materials. Garments, for example, are worn by the owner for a considerable time, in the course of which they may be dry-cleaned a number of times. Finally the garment is almost worn out. This condition is not apparent, but there are places in the garment almost ready to give way. Then, during the final dry cleaning, when the garment is heavy with cleaning fluid, the strain due to the handling incidental to cleaning causes the material to tear. In such cases the dry cleaner simply considers that the "death" of the garment from natural causes has occurred in his plant and a fair-minded customer will not blame the cleaner. There are other sources of trouble, however, that are even less apparent to the customer and for which the dry cleaner must pay unjust claims. Probably the most prevalent of these are complaints regarding color on silk.

Dyes That Fade in Dry Cleaning

The colors on silk and rayon are often required to be bright and modish. Possibly more thought is given to producing a fashionable shade than to its endurance. At any rate some of the colors that come into dry-cleaning plants are not suitable for materials that must be cleaned. The most offending colors are browns, blues and greens. Not all browns, blues and greens cause difficulty in dry cleaning, but some of them do. In the dry-cleaning process they will become entirely changed in shade, sometimes to another color. The writer's observation has been that it is blue that is the most offending dye. Browns and greens apparently containing blue are altered, due to the failure of the blue dye contained in the color. Only soaps that contain an excess of free fatty acid are used in the plants with which the writer is familiar, yet the change mentioned occurs in the cleaning process. It is true that often the color can be restored by dipping the material in a dilute acid, such as acetic acid; but when this practice is resorted to, the process is no longer "dry cleaning." In some cases articles are ruined if they must be wet with water.

Dyes Not Fast to Perspiration and Water

Another source of color trouble is attributable to the fact that the dyes used are not fast to perspiration. This difficulty is also more often observed on silk and rayon materials than on any of the other textile fabrics. Under the armpits and across the back the color will be faded. This effect is not confined to a particular color, but usually is seen in the lighter shades. The reason that fading of this nature is troublesome to the dry cleaner is that the faded parts are more or less covered with dirt and soil, and when this is removed in the cleaning process the fade shows up more plainly.

Another color difficulty is due to the running of color in a spot caused by spilling water on certain dyed silks. When a drop of dirty water, for example, is spilled or splashed on a dress made of a piece of such silk, dye runs to the edge of the ring thus made, and then when the dress is cleansed the spot can be removed except for the ring of dyestuff. The ring is more apparent after the dirt has been removed. It is difficult for the owner of the dress to understand why the garment must be redyed to remove the ring. Such remarks as "I paid a big price for the dress and it should not fade like that," are among the complaints made by the owner.

Finishing Causes Trouble

Particularly within the last year the finishing in silks has been a source of worry to dry cleaners. When the material is purchased it has good handle and appearance. After it has been dry cleaned, however, it loses luster or sheen, and after two or three dry cleanings it becomes

flimsy. It is mostly in cheap dresses and draperies that such materials are found; but even though the article is cheap, the owner expects it to wear a reasonable length of time. Finishing compounds are also the cause of unsightly rings in materials on which may be spilled liquid that cause an uneven distribution of the finish in the materials. Sometimes the skillful spotter in the dry-cleaning plant can work the rings out so they are not manifest, but frequently it is necessary to wash the article in water to remove all the finishing material and then refinish it. The operation of washing and refinishing is not always practicable because of the design of the article or because to wet the material in water will cause it to shrink so that it is no longer useful. The finishing problem is further complicated for the dry cleaner because the cloth is finished in the piece in a manner that it is impossible to duplicate in a made up garment or drapery.

Shrinking and Stretching

Shrinking and stretching are sources of considerable trouble to the dry cleaner. These difficulties are not confined to fabrics made of any one of the textile fibers, as any materials may have these objectionable properties. Shrinking and stretching are mentioned together because the same inherent cause is often responsible for both effects. The common cause in this case is the nature of the threads and the weave. The writer has observed linen and cotton suitings that were loosely woven from loosely twisted threads that would stretch when they were being pressed until they were inches too large for the owner. In other cases too tightly twisted threads, principally in silk, caused materials to shrink even when the smallest amount of steam possible was used for pressing them. Such silk materials are of the nature of crepe weaves which in the finishing process have been stretched to size and dried flat. The least amount of moisture causes them to shrink. When such material has been shaped into a garment, even a small amount of shrinking makes it useless to its owner, and often the amount of shrinkage is not small. In general, shrinking is a property of textile materials that is not new. It may be expected in water cleaning if the materials are not properly handled. Even in water cleaning textiles properly handled should not shrink; but in dry cleaning with such inert liquids as petroleum naphtha materials must not shrink if they are to give satisfaction to the owner. Fabrics should be made and finished so they will not shrink when properly dry cleaned. It is a foregone conclusion that most fabrics in service must be cleaned at some time and dry cleaning is the mildest method of cleaning known.

Notwithstanding statements that tin-weighted silks are as durable as unweighted silks, they are a source of difficulty to the dry cleaner. By weighted silks reference is had to the heavier weighted silks in particular, i. e., 18/20 oz. silk or heavier. Many cases have been called to the writer's attention where weighted silk in dresses has failed after a short wearing time. The failure is usually where the silk has been in contact with perspiration. The threads become weak and the fabric falls into holes. This often happens in the dry-cleaning plant because there is an extra strain on the materials during cleaning while they are heavy from being wet with cleaning fluid. Such materials as taffetas are notorious for the property of weakening and breaking in a comparatively short time, but in dress materials such as crepes these properties are not expected by the customer.

Rayon is a textile fiber which, in the form of all-rayon and as union goods, is getting to be more and more common in dry-cleaning plants The dirt is readily removed from rayon by dry-cleaning methods, but when the spots that remain after washing in petroleum naphtha are taken out the luster of the material is often destroyed in those places. It is necessary to wet the whole article in water to obtain an even bright finish on the fabric. Other difficulties the dry cleaner has with rayon are caused by the nature of the weave, insufficient reinforcing of the regenerated cellulose rayons with stronger fibers, and by deterioration due to the effect of light and heat.

Rayon threads are smooth, and, unless fabrics are designed with allowance for this property, they will slip even though they are carefully handled in cleaning. This condition obtains more often in drapery materials than in any other case observed by the writer.

Sometimes rayon articles become so soiled or spotted that they must be washed in water. It is well known that regenerated cellulose rayon loses much of its tensile strength when wet with water. This property makes it difficult to clean the material, because some handling is necessary. Even when the greatest precautions are observed, the materials will be torn during the operation of washing them in water. The most satisfactory regenerated cellulose rayon fabrics for water washing are those in which the rayon threads have been strengthened with some other textile fiber. For example, a fine cotton thread covered with rayon makes a durable thread. Celanese and Lustron give no trouble in this respect.

Rayon drapery materials that have hung in windows exposed to light are often weakened to a point that they will not stand the strain of dry cleaning. This is particularly true of draperies that have hung over or near radiators.

Co-operation Needed

There are other difficulties with which the dry cleaner must contend; for example, imitation leather, improperly

dyed furs, feather articles held together with rubber cement, etc. The alert dry cleaner is on the lookout for articles received for cleaning which may cause any of the difficulties mentioned. In apparent cases the owners of the articles are informed of the difficulties that may arise, and the article is either cleaned at the owner's risk or else returned without cleaning. Even though the expert dry cleaner recognizes many of the materials with which there will be trouble, there are some troublesome cases that are not apparent and get by. Furthermore, there are constantly new creations in color, style, etc., whose difficulties the dry cleaner must learn by experience. The dry cleaner is not infallible; he makes mistakes as other people do, but the majority of the complaints that come into a well-operated plant are due to causes beyond the control of the dry cleaner. One modern establishment known to the writer that cleans on the average of 1,200 ladies' dresses and 1,200 men's suits each week has an average of twelve complaints from customers per week. All the complaints are not caused by faults in materials; some of them arise from faults originating in any organization that must handle such a large volume of work for so many different patrons. It is worthy of note that the complaints constitute only a small percentage of the volume of work handled. Yet each complaint has a real significance and means disappointment, to say the least, to each patron that brings it. There is certainly no excuse for avoidable happenings which cause complaint. Many of the causes for complaint, some of which have been mentioned, could be obviated by closer co-operation among textile manufacturers, garment manufacturers, and dry cleaners. Much could be gained by then properly labeling them, so that, when they reach the consumer, he would know what to expect from the material purchased. Something more adequate than the "Truth in Fabric" bill, lately before Congress, would be necessary to accomplish this purpose. Fabrics should be designed with the idea in mind that they will have to be dry cleaned. In some manufacturing localities articles must be dry cleaned many times during a reasonable period of service.

Here I have a sample of a lady's coat. That silk is 20 to 22 ounce silk, and you can see how it has gone to pieces. It was supposed to be a very valuable coat (part of a suit), and the lady was very much disappointed; she couldn't understand why it should go to pieces in this way. In fact, the company that cleaned it now has a lawsuit on its hands involving the condition of the coat. It is quite apparent that the silk has tendered, due to the weighting in it. The cleaner is not at fault. Yet the customer will attempt to hold that cleaner responsible for it.

Here is another example of some of the difficulties that we have with dyed articles. Here are two draperies. One of them, you notice, is green and one is brown. They are out of a lot of draperies that were dry cleaned only; no water was used at all. Of the lot, this one curtain turned brown; the rest of them remained the original shade, green. We tried various methods, such as running it through acid, and things of that kind, to restore the color but nothing would restore the shade.

Those are examples of things that the dry cleaner is up against and I would appreciate it, if anyone here is interested enough, after this talk or even now if he will tell me what happened to that brown drapery. I must tell the customer when I get back to Pittsburgh. (Laughter.)

I have some other samples here. Here is a piece of rayon drapery material that slips very easily. Just the least little pull, if you will notice, causes that material to slip. Even though the most careful dry-cleaning methods are used, that drapery is liable to slip, and when it slips it is ruined.

Here is a silk drapery that came in to one of the dry-cleaning plants. That was in use for a year and a half. The pieces that you see there are where the folds occurred in the drapery; the bottom part was protected by the window sill. Where the sunlight has reached that silk, there isn't any. That was received whole and apparently was in good condition when it came into the dry-cleaning plant; in going through the dry-cleaning process you can see what happened to it.

Here is a piece of woolen material. In some cases, as I mentioned in the paper, it is necessary to wet articles with water in order to clean them, but that is not very often the case, and only in cases where it is absolutely necessary is that done. But here is a piece of wool that does not dry clean well at all and it is necessary to wet it. That shrank something like fourteen inches across the width when it was wet with water. A garment made from that material came in to the plant. It shrunk eight inches across the shoulder and sometimes like a foot or sixteen inches in the length. (Laughter.) When it came in it was supposed to fit a grown person; when it got through the process it wouldn't fit a child.

Here is an example of a piece of weighted silk on which a little salt water was spilt. You will see that it is quite tender in those spots. The rest of the silk is in fairly good shape.

Those are all the examples of textile defects that I have. I shall be glad to answer any questions about dry cleaning that I possibly can. (Applause.)

Chairman Killheffer—In connection with the case in which a garment shrank eighteen or twenty inches in length, that might be a happy method of transforming

an old type of skirt into a new style one. In connection with one of the samples you displayed, I should imagine that in some of the plants they would have to hire a detective to try to find the garments after they had been through the dry-cleaning process.

Mr. Jackson—That is true. That actually happens.

Chairman Killheffer—One other thought occurs to me: that in this age of highly colored liquids and with liquids of more or less high alcoholic content, you have many different kinds of spots to contend with.

Mr. Jackson—That is true, too, but luckily the fabrics are built to withstand those particular fluids.

The Need for Dry-Cleaning Tests

By Clarence C. Hubbard

National Association of Dyers and Cleaners

Mr. President, inasmuch as the Committee here are talking at length about wet washing or a test for washing, it is my hope that some interest will be evinced in tests for dry cleaning as well.

The dry-cleaning industry, that is, the cleansing and redyeing of worn garments, is, we believe, here to stay. Within a period of thirty years it has grown from receipts of $4,000,000 for this service to better than a half billion, and at its present rate of growth it will possibly exceed a billion dollars in receipts within a period of less than five years.

I want to correct an impression that might have been gained from Mr. Jackson's talk: that garments might be wholly cleaned in naphtha. That brings out one salient feature, namely, that any stain or soil containing moisture or such staining materials as perspiration must of necessity be wet washed. Dry cleaning will not remove moisture containing or tinctorial stains. Neither will it affect perspiration. However, the dry cleaner must of necessity dry clean first in the handling of any type of fabric, inasmuch as it will remove some soiling materials, so as to enable him to make his washing processes much shorter, using shorter baths and perhaps less detergent materials in that process.

I just bring this before you because we feel it has intrinsic value, that is, the testing of materials in the dry-cleaning process as well. That is simple and will give you your reaction toward dyestuff and fabric, and I must say, although this is the hundred and first year of our existence, just recently (in fact, two weeks ago) we first encountered woolen materials that had shrunk as much as nine inches across the shoulder and twelve inches in length in naphtha alone—all-woolen material. We have traced the manufacturing, the mill agency, and all, but, first, we must try to find, by analysis, those things which have been incorporated in the fabric. Because of the fact that the naphtha process has removed these ingredients, we are prohibited from making a complete report.

If the manufacturer will co-operate as all others along the line have done, we may perhaps diagnose our difficulties.

The cleaner, of course, views these things with great alarm. My instructions to the cleaner, however, being their technical adviser in the Bureau of Standards, is that inasmuch as their claims for damage do not exceed one per cent of their total gross volume, they should pay these claims, shoulder the burden and grin. This, though being ever so worthy, should not deter the correction of faulty practice.

I may be pardoned here for referring to two or three things, one of which is the faulty rinsing of acid dyestuffs from woolen materials which are woven into fabric in which rayon or silk stripes are placed. Eventually, the acid leaves the woolen material or is traced into the other materials (the striping of silk and rayon) with resultant destruction.

We think those are important factors.

One outstanding thing in the minds of textile men today, since our meeting with some thirty of them on September 20 in New York, is that there is a necessity apparently for the development of standard tolerances in the shrinking of fabric. That is, there is a great variance in the tentering of material during manufacture, and there seems to be need for shrinkage tolerance standards.

We are building a research institute in Washington, D. C., costing approximately one-half million dollars. The textile interests and manufacturers in considerable number are anxious that we put over tests on materials that are being manufactured in relation to dyestuffs in both dry cleaning and wet washing. We may place another laboratory in New York City, that the retail merchants may have tests conducted there. There is a demand for that. We have been requested to give that service to them.

Thank you. (Applause.)

Discussion of Dry-Cleaning Problems

Chairman Killheffer—This is a highly interesting paper that Mr. Jackson has presented, and it has been added to and commented upon very appropriately by Mr. Hubbard. We would like to hear any discussion on this subject that you may have in mind.

Dr. Walter M. Scott—Mr. Chairman, in his paper Mr. Jackson spoke a little bit about the bleeding of prints from the colored portion into the white. That is a subject which is extremely interesting to me.

It is well known, of course, that if you leave a silk print, even though it may be a washable print, in a very damp condition for any length of time, the color is liable

to travel along the fiber from the print into the white. I wondered if in dry cleaning they have noticed in any particular colors a tendency to bleed from the color into the white, into the dry cleaning solvent also. That is, has it ever run into that?

Mr. Jackson—No, that generally does not occur. In my experience, I have had two or three cases like that, but those were cases in which oil soluble dyes were used. Very seldom do we run across a thing of that kind, but occasionally, as I say, we do. In connection with the other dyestuffs, I have never known of any of the dyes to run, that is, printed dyes, in the dry-cleaning process.

Hugh Christison—I should like to ask Mr. Jackson what this woolen material was like that shrank so much in dry cleaning.

Mr. Jackson—Mr. Hubbard mentioned the one that shrank in dry cleaning.

Mr. Hubbard—Mr. Christison, the white wool garment that shrank so badly in dry cleaning was a sulphur bleach and woven into a basket weave. It was interesting to note that there were two patch-pockets approximately eight or ten inches square on each side of the coat that were not affected at all. The balance of the coat was very much puckered up and drawn, but it did not have entirely the feel that is common after wet washing.

This is something to fortify that statement: the coat was lined with silk dyed with Carmine, and one that was fugitive even to distilled water. So that had the coat encountered moisture in the naphtha in any way, the sulphur bleached fabric would naturally have absorbed a great deal of that dyestuff. But the wool was not stained at all. It was perfectly white and nice, but badly drawn.

Professor Grimshaw—Mr. Jackson spoke about regenerated cellulose rayons (with the exception of Celanese and Lustron) losing tensile strength when wet with water. How does naphtha affect them?

Mr. Jackson—It doesn't affect them.

Professor Grimshaw—And the rayons do not stretch and stay stretched with naphtha?

Mr. Jackson—No, not with naphtha.

Chairman Killheffer—That is, even though they have taken up the additional weight of the solvent that they might be carrying at the moment, their strength is just the same?

Mr. Jackson—Their strength is just the same. Of course, the physical weight may cause some stretching, but as soon as the naphtha is evaporated out of them they go back to their original shape and form.

Professor Grimshaw—Do I understand that there is elasticity with naphtha and not with water?

Mr. Jackson—Yes, I would say that is the case. The cloth may be elastic, due to its weave, or perhaps it is a knitted cloth; it may be elastic on that account. The fiber itself is unaltered in naphtha. It is very much the same as when it is dry.

Chairman Killheffer—Is there any further discussion on this paper?

For the moment we shall pass the next paper as we will have somewhat better facilities for its presentation this afternoon, the next paper requiring some slides. We will now have the paper on the "Dyeing of Union Shades on Hosiery Containing Rayon, Pure Silk and Mercerized Cotton," by Mr. Chas. B. Ordway. (Applause.)

Dyeing of Union Shades on Hosiery Containing Rayon, Pure Silk and Mercerized Cotton

By Charles B. Ordway
Spalding Knitting Mills, Griffin, Ga.

Mr. Chairman and Gentlemen: This is a novelty proposition that I am about to discuss because it is applicable to infants' hose more than to anything else. The mill with which I am connected makes children's or infants' hose exclusively. It is one of the few in the South.

Talks and conventions remind me of the old negro who lived on the Southern Railway right of way; two children of his had been killed and when the third one came along he named it "Schedule," because he knew that railroad won't goin' to run on Schedule.

But I will endeavor to differ from the old negro and try to run on my schedule as close as possible.

When I arrived at my present position they were making an infants' hose containing viscose type rayon top, Japan Silk leg, and mercerized heel and toe. They were having great difficulty in maintaining the same tone on all three of these distinct fibers. The rayon top and silk leg would be a union shade, but the cotton heel an off shade, or vice versa.

This showed that the formulæ were not worked out correctly as to temperature, rate of exhaustion, and affinity of the dyestuffs for the three fibers.

I then tested over a hundred dyestuffs at temperatures ranging from 170 deg. Fahr. to 210 deg. Fahr., on this hose in a 1-20 bath with and without the addition of Glauber or common salt to the bath before I started matching the shades, keeping all the dyeings properly marked as to the results for rate exhaustion, affinity, and difference in tones, and the amount that the neutral dyeing colors stained the rayon and cotton.

All shades possible were matched, using Direct Silk White and neutral dyeing colors. Those colors showing the slowest rate of exhaustion gave the best results.

The yellow shades were the most difficult, as Direct Yellows have a great affinity for mercerized cotton, leaving the rayon a light off shade. Using Stilbene Yellow, Metanil Yellow and Azo Yellow, I split the boiled-up

color in two equal portions, entering one part and the goods at 140 deg. Fahr., bringing up to 205 deg. Fahr. in twenty minutes, adding 10 to 20 per cent common salt, running twenty minutes at 205 deg. Fahr., adding equal amount of salt and rest of color and boiling twenty minutes longer to obtain shade desired.

My object in using Metanil Yellow was to stain the rayon top enough to make up for off shade caused by the affinity for the cotton, as it usually boils off the silk when the temperature goes over 190 deg. Fahr.

In case the temperature is not held at 205 deg. Fahr., the rayon top will be a light shade and heel and toe too heavy to make a good union.

For blues I used Direct Blue RW, 6B, and Diazo Black BH, Pontacyl Blue 5R, Wool Blue N, and Green B in a 1-25 bath or longer bath. Entering goods at 120 deg. Fahr., bring to 190 deg. Fahr. in twenty minutes, and adding 5 to 30 per cent Glauber salt, holding at 190 deg. Fahr. for twenty to forty minutes.

The formulæ, of course, have to be worked out according to the various types of shades that you have on blues. I had approximately ten varying shades on blues, from a Sky to a very heavy shade like a Navy or a medium tone like Yale Blue, which has been very popular for the last year or so.

The light tans and browns were matched with the Pontamine Catechues in place of the Direct Browns like 3Gn and GR, as they gave better unions on all the range of shades. Take a range from a light Champagne on to a Russet Brown, French Tan or Russian Calf, or any of the darker shades that the women use. They were dyed by the same method as the blues.

You probably have noticed on those socks that have gone around that the green shade I have there is very bright. I had great difficulty in running that shade because most of the Direct Sky Blues will go on the rayon heavier than on the mercerized cotton, and the Direct Bright Yellows will go on the mercerized cotton heavier; so I found that I had to select the most brilliant Benzo Greens and Yellows that I could find. I started them at 140 deg. Fahr., and went to 180 deg., adding 5 to 10 per cent of Glauber salt, maintaining this temperature twenty to thirty minutes. I found this gave me the best results.

I tried every combination of reds that I could find without securing results desired. The mercerized cotton and rayon would become two different shades on storage. My only remedy was to match the rayon top and silk leg, and trust that the purchaser would not be too critical. Pinks were run in a short bath and heavy shades in a long bath similarly to blues.

All of these goods were processed by the two-bath method of first degumming silk, extracting, and entering in dye bath.

The equipment used consisted of Monel metal lined paddle machines, the paddles having 12 to 20 revolutions per minute, according to the size of the machine. Water used was of zero hardness, and a steam operated temperature controller gave the exacting temperatures required. The various dyestuffs found best after practical production were as follows:

Direct Black LN, Diazo Black BH, Yellow SX or Stilbene Yellow, Flavine S, Red 8BL, Catechu GN, B, 3G, Green MT, Scarlet 4BS, 4BA, Violet N, 3R, Red FD, Orange EG.

For the neutral dyeing colors: Red GD, Red WH, Azo Yellow, Cloth Brown 5R, Blue N, Blue A, Blue 5R, Orange R, Green B, Violet 4BN, 6BN, 10B and Brown AN.

Of course, this is just a brief outline. A subject like this is so broad that no one can cover all topics completely; one can only touch on a few of the shades where most of the trouble is caused.

I believe that this is all I have to say. If there are any questions that you would like to ask me, I shall do my best to answer them. I have just made a brief outline here of the chief topics. (Applause.)

Discussion of Union Dyeing

Chairman Killheffer—Is there any discussion on this topic?

William H. Cady—I would like to ask what kind of rayon was used?

Mr. Ordway—The Viscose type.

Mr. Cady—Made by the Viscose Company or Du Pont?

Mr. Ordway—I used Du Pont Viscose in part of it and the Viscose Company's product in other parts. But they run similarly. They both ran true to form on those experiments I have attempted to make. It took me about six month to work out some of those combinations to the point where I could get them on practical production, and I used straight formulæ all the way from 10-pound lots up to a 160 pounds.

Mr. Cady—Don't you find the Viscose silk has more affinity for certain dyes than the Viscose of the Du Pont Company?

Mr. Ordway—Yes, on certain colors, and especially when it has been given a half bleach it has a greater affinity for certain dyestuffs at higher temperatures.

Chairman Killheffer—Is there any further discussion on this paper?

A moment ago I said that we would postpone Mr. Goldthwait's paper. We are going to let that go over until after lunch, because the time is too short for the presentation of that now. We have one very short paper here by Mr. Milne, who is not here, and with your permission, I will ask the secretary to read it now.

. . . Secretary Hadley read the paper entitled "Printing and Discharging of Colors on Celanese":

Printing and Discharging of Colors on Celanese

By William Milne

Sussex Print Works, Newton, N. J.

I suppose that the subject of Printing and Discharging of Colors on Celanese has been assigned to me because of the reasonably large amount of printing that the Sussex Print Works has been doing on this fabric with very fair success.

Unfortunately we are not able to speak with authority upon the discharge method of printing on Celanese dyed grounds as this phase of printing is only under the process of development and our work has not as yet been along that line. We can only point out the fact that the American Cellulose & Chemical Manufacturing Company, Ltd., and Doctor Cotton, of the General Dyestuffs Corporation, have developed an interesting series of colors suitable for dyeing Celanese which are dischargeable with different reagents giving beautiful effects which we know will be of great interest to the industry when they are put on the market.

The few remarks that we may make on the subject shall be free from technical phraseology as all who are interested in Celanese must be familiar with the technical information given by the American Cellulose & Chemical Manufacturing Company, Ltd., together with the mass of technical matter found in the trade journals and magazines.

We find that in dealing with Celanese we are handling a fabric the structure of which is very susceptible to chemical change effected by the reagents and temperature used in processing the goods. The mechanical method of handling Celanese fabrics may vary to suit the mechanical conditions of various plants, but these are not so important as the careful attention to temperature and chemical reagents used.

In preparing the various Celanese cloths for dyeing and printing it is just as much a nesessity as it is in other fabrics to have them well bottomed or free from all sizing and dressing, and if this part of the process is well handled the dyeing and printing becomes a problem no more complicated than that of any other fabric.

To that end care should be taken to see that the scouring baths are kept at a temperature no higher than 170 deg. Fahr., and that with the exception of a slight amount of ammonia no other active alkali is used with the soap scouring solutions.

The goods being thoroughly cleansed we find that dyeing with the so-called S R A colors and other selected colors of that type is comparatively easy and these being dyed in a soap solution are considered fast. Nevertheless, particular attention must be given to the different temperatures at which the various dyes have their maximum affinity for the Celanese and, of course, in dyeing and printing compound shades, the dyer and colorist have an interesting and tricky problem to handle.

The demand to-day for fast colors both in dyeing and printing has naturally led us to develop this type of color in our printing and we have had very good success, using a selected line of vat dyestuffs.

It would be natural to suppose since the fabric is so susceptible to reactions with alkali that the alkaline nature of these vat colors would tend to convert the Celanese into rayon, thereby destroying its original properties, but we find with care taken to avoid excessive heat in drying and with the minimum amount of alkali used in the printing color, that neither the drying or subsequent aging has had that effect, although we have had experiences which have shown that we must watch this particular point very carefully.

We have also printed Celanese successfully with the S R A colors, but find that due to the oily nature of the colors we have more trouble in keeping clear cut edges on the figures when the goods are undergoing the steaming process. This, however, may be obviated by the use of aluminum acetate.

In our endeavor to keep bright colors in our printed effects we have naturally kept our dyed ground shades very light, since they are not dischargeable with hydrosulphite. Nevertheless, we have obtained very beautiful results and when a line of discharge colors is available for dyeing Celanese, and that is coming very soon, there should be no reason in the world why Celanese should not be ranked with the Queen of Fabrics.

Chairman Killheffer—I might announce to you at this time the result of the vote on the proposed amendment. The motion to pass it to a letter ballot of the Association was almost unanimously carried. As only a two-thirds vote is required, it will be so passed to the membership in due course.

. . . Announcements were made regarding the afternoon session, and the banquet. . . .

Chairman Killheffer—If there is nothing further to come before the meeting we will stand adjourned.

. . . The meeting adjourned at twelve thirty o'clock.

Applicants for Membership

Active Membership

Albrecht, Chas. H., chemist, Bell Company, Worcester, Mass. Sponsors: Louis A. Olney and A. K. Johnson.

Coplin, J. E., dyer, Lowell Manufacturing Company, Lowell, N. C. Sponsors: M. T. Johnson and C. H. Stone.

AMERICAN
DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

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THE MILL EXECUTIVE AND THE A. A. T. C. C.

THE American Association of Textile Chemists and Colorists has undoubtedly been of tremendous practical benefit to its members who are mill men. Those dyers and chemists who have made it a practice to attend meetings of their local sections with more or less regularity can unquestionably testify to the truth of this statement.

The day was, not so long since, when dyers regarded themselves as the custodians of "secret" processes, which they felt it necessary or desirable to guard jealously from other members of their profession. To-day "rule of thumb" methods have largely yielded to science and the dyeing departments of the larger textile mills are in most cases operated on as scientific a basis as a university laboratory.

This change for the better has gone hand in hand with a freer interchange of technical information and experience among all members of the dyeing and textile chemical fraternities. Through this process certain mills may possibly have lost something of a "secret" nature which they formerly possessed, but the average standard in all mills has been immeasurably raised and the industry as a whole is an undoubted beneficiary.

The American Association of Textile Chemists and Colorists has been a very potent factor in effecting the exchange of information of this character and its benefits to the textile industry at large can scarcely be estimated.

With this proposition so clearly established in the minds of those competent to judge, it is extremely surprising that many mill managers and executives still persist in regarding this Association as a purely social organization, attendance at whose meetings by their employees they regard as a pure waste of time.

This condition is of course not general, and it is worthy of note that the largest and most progressive textile manufacturing concerns are outstanding exceptions. These latter companies not only urge their chemists, dyers, finishers and assistants to attend meetings whenever possible, but even defray traveling and incidental expenses where meetings are not held in their immediate neighborhood.

The fact that these large concerns have found it profitable to have their technical and practical staffs participate actively in the meetings of the Association should be sufficient argument to induce all mill managers to do likewise.

It is a fact, however, that very few of them take this view. A letter recently received by The REPORTER from Noel D. White, Superintendent of Dyeing at the Davenport Hosiery Mills, Chattanooga, Tenn., expresses this point of view very clearly. A portion of Mr. White's letter follows:

> Why were there so few dyers at the Annual Meeting in Charlotte, and why do so few attend the Sectional Meetings?
>
> My employer thinks that we go there just to have a good time, just as when we go to a convention of the Shriners or the Red Men. It does not occur to him that I may learn something and so make a better worker for him, aside from participating in the always interesting programs provided for us.
>
> My own experience is that in one instance I learned how to eliminate all uneven tops in my hosiery dyeing, simply by talking to one of the dyers present at one gathering. Also, that several dyers have come to me for advice in their work and went back home the wiser for it.
>
> When there was no Association we dyers did not go parading our shortcomings. Now we feel that we belong to a society designed for our mutual benefit, and we do not hesitate to ask questions pertinent to our work of one another.
>
> You know how careful we used to be in the past to guard jealously our ways of working. Now all this is gradually changing—thanks to the Association—and if you could bring employers to see the benefit which the dyer can derive by attending the meetings of the sections I am sure you will have rendered a great service to all concerned.

THE DYE INDUSTRY INVITES MORE INTEREST

BACK in the days following the war the development of an American dye industry was a front-page topic. It was a cause that had won a host of champions, even though at times it may have appeared forlorn. Valuable support came from outside as well as from within the industry—from textile interests and others who had the dye manufacturers' cause at heart. Without this ardent interest on the part of those who were watching the in-

dustry's valiant fight for protection, that fight undoubtedly would have been harder and much longer.

When the Synthetic Organic Chemical Manufacturers' Association, which comprises American firms who make dyes and other coal tar chemical products, was organized, privileges of associate membership were extended to those outside the industry who desired to continue their friendly relations. The annual dues for that membership have recently been reduced from $250 to $100.

Associate membership offers an opportunity for those who are not dyestuff manufacturers to show their interest in the welfare of the American dye industry. Such members, while not entitled to voting privileges in matters of association policy, are permitted to attend the very interesting informal meetings of the Dyestuff Section held monthly in New York. Instructive, non-technical discussion of subjects intimately related to the American dye industry, such as tariff legislation, Government reports and patent disputes, are regular features of these luncheon meetings. They are an important means of bringing together members and friends of the industry, first, for constructive intercourse on the most significant matters affecting the industry, and second, for closer understanding of each other's problems, thereby fostering in the dyestuff trade a most beneficial spirit of harmony and co-operation.

The American dye industry is not at present engaged in a struggle for protection, nor is it beset with the many other perplexing problems that once made its course so hectic. But it still needs and values its numerous friends outside the industry. Through the medium of associate membership in the S. O. C. M. A. it enables those friends to aid its future expansion by displaying an interest in its present activities. The reduction in associate membership dues should help to widen that interest.

OAKITE PRODUCTS HOLDS ANNUAL BANQUET

The Tenth Annual Banquet of Oakite Products, Inc., manufacturers of Oakite, was held at the Hotel Pennsylvania, New York, on the evening of December 9. Eighty odd field salesmen of the company were the guests of the sales and executive departments, as well as a goodly number of outside guests.

The dinner was the occasion for the display of a great deal of enthusiasm by all present, and was featured by the presentation of prizes given by the company to salesmen who have exceeded their quotas.

Louis H. Heilbronner, secretary-treasurer of the Holeproof Hosiery Company, announces that his company has purchased the mill and plant of the Columbia Knitting Mills at 3202 Center Street, Milwaukee, taking possession February 1. It is said that the deal involves $100,000 and will increase the capacity of Holeproof, but that the Holeproof has not taken over the business of the Columbia, which is understood to be negotiating for a site for a new plant.

Fastness Standards Discussed By Misbranding Committee

Opinions on Plan Differ, but Approval Is General

A PLAN that will eliminate the fast color guarantee and replace it with definite standards for fastness formed the subject of a lively discussion at the recent meeting of the Joint Committee of the Textile Industry on Misbranding. A brief report of this meeting appeared in the last issue of The Reporter. Much of the discussion was of such interest as to warrant a more detailed story, however.

The movement against the misbranding of textiles was started by the converters with an attack on misleading fastness guarantees. The Joint Committee on Misbranding was organized to establish standards of color fastness and pave the way for more ethical trade practice by general use of these standards. At the meeting George Fogarty, of the Converters' Association, chairman of the committee, declared that they were not interested in advocating faster colors or in promoting any special brands. He said that approval of the standards was the most important factor M. J. Warner, chairman of the Subcommittee on Fastness Standards, explained that the purpose of the committee was to protect the industry and the public from unfair methods of competition. The word "guarantee," he said, meant nothing to the unscrupulous retailer, jobber or manufacturer.

The committee originally intended to co-operate with some Governmental body, such as the Federal Trade Commission, in defining the terms "sunfast" and "wash fast," because complaints had reached the industry through that commission. Instead, however, a subcommittee was appointed to establish fastness standards. The purpose of the recent meeting was to discuss the plan that had been accepted.

Two members of this subcommittee, Prof. L. A. Olney, president of the American Association of Textile Chemists and Colorists, and William D. Appel, of the Bureau of Standards, were requested to work out a suitable system of standards. Their report, which appears in full below, came in for both praise and blame during the discussion. It divides colors into three classes as to washing and three as to light; tickets or labels affixed to textiles would indicate the degree of fastness in each case, classification being based on specific washing and light tests. The plan submitted covers only cotton goods. Similar standards for wool, silk and rayon, it was agreed, will also be determined and discussed at another meeting.

The present type of fastness guarantee, it was brought out at the meeting, has no limits; it cannot be clearly defined. The chief point in favor of the new plan is that each degree of fastness will be strictly limited by definitive tests.

That the committee had followed a very sane method in solving the fast color problem was the opinion of Edward L. Green, of the National Better Business Bureau. In discussing the proposed standards, Mr. Greene said it will be a problem to get the manufacturers and others to accept and use the standards. It was agreed that an educational campaign will be necessary, but that by means of printed leaflets explaining the classes of fastness in simple terms, and through properly trained sales clerks, it is believed the plan will succeed.

A representative of the Good Housekeeping Institute, Katharine A. Fisher, who spoke at the meeting in the interests of the consumer, described the new standards as an epoch-making step in the right direction. Replying to her question as to what authority the Institute might refer in disputed cases of fastness, she was told by the chairman that it was likely a body such as the Mellon Institute, the Bureau of Standards or the American Association of Textile Chemists and Colorists would be designated as mediator.

Textile Groups Discuss Plan

Representatives of several other prominent textile trade groups entered into discussion of the standards submitted. George E. Crawford stated that the laundry trade was especially interested in any plan that will help to settle the numerous claims against laundries caused by goods losing color. Richard Greenwood, representing the Master Dyers of Philadelphia, pointed out that the new standards made it possible to repeat with ease a given fastness test whenever necessary to establish the classification of some color. He discussed with Mr. Appel the fading differences of cloudy and sunny days. Herman Blum, president of the Craftex Mills, and representing the Upholstery Weavers' Association, declared one objection to the standards is that they will tend to raise sales resistance against Class B fabrics and inferior grades. He stressed the importance of devoting considerable study to fastness of fabrics containing rayon.

One of the strongest objections to the plan of classifying fabrics according to fastness standards came from J. K. Milliken, president of the National Association of Finishers of Cotton Textiles. He declared the entire plan is "unworkable," maintaining that the committee had lost sight of the more practical phases of the problem in their study of the technical side. Fabrics made by well known, reputable manufacturers, Mr. Milliken said, seldom cause fastness complaints. He urged that the consumer be taught what fabric brands are fast and what are not, and that the dyer's name be affixed to the fast color labels. He also suggested that the Federal Trade Commission compile a list of those manufacturers who should be permitted to offer fabrics as fast. Mr. Warner, the chairman, answered these objections by saying that if the standards are eliminated it will still leave the industry with the problem of combating the false fastness guarantee. He said the committee had absolutely no intention of offering the public anything of a technical nature, and that the standards merely served to define to those in the trade certain definite degrees of fastness.

The standards report submitted follows:

Communication Supplementing Report on Color Limitation

M. J. Warner,
Subcommittee of the Joint Committee on Fast Colors,
New York City.

Dear Mr. Warner: We herewith submit the Report which the Subcommittee of the Joint Committee on Fast Colors, at a meeting held March 3, 1926, requested us to formulate.

The method for fastness to washing is based on the treatment that cotton goods may receive in domestic or commercial laundering, namely, an alkaline soap solution and hot pressing in the case of solid colored fabrics, and alkaline soap, bleach and hot pressing in the case of white goods containing colored patterns. The method recommended for fastness to light is a practical sun test, and attention is called to the fact that the thirty days' exposure mentioned, is easily equivalent to 150 hours of exposure upon the Fade-Ometer.

The methods offered have been formulated only after a very thorough consideration of the subject, and in consultation with a number of experts, including members of the Research Committee of the American Association of Textile Chemists and Colorists, and our suggestions are in agreement with their views. This Research Committee has been engaged for several years upon the development of standard fastness tests. . . .

It is evident that all the colors of any particular line of dyed fabrics will not have the same degree of fastness. As a consequence, endeavors to establish an extensive line including too great a variety of colors have resulted in the inclusion along with dyed fabrics of extreme fastness, a few which would fall far below the standard of the others. It is therefore probable that certain shades now included in the so-called fast lines will not meet the requirements of "Grade A" given in this report. This, however, should be no argument against the proposed tests for the exclusion of a few shades is inevitable if the fastness is to be truthfully represented. Certain shades in truly fast colors, as, for instance, brilliant greens, cerise reds, bright pinks and brilliant violets, are not to be had at the present time because no dyes are known suitable for their production. The consumer must be educated to this fact.

It is equally true that goods coming in "Grade B" will have a considerable variation of fastness, ranging from

those which just fail to pass "Grade A" test, down to those which come just above the minimum requirements.

However, to erect a greater number of classes than those recommended would, in our opinion, only lead to confusion and would serve no useful purpose.

Respectfully yours,

(Signed) Louis A. Olney.
Wm. D. Appel.

Report of the Subcommittee of the Joint Committee on Fast Colors

In accordance with instructions from the Subcommittee of the Joint Committee on Fast Colors given in the form of a resolution at the meeting of March 3, 1926, the following recommendations are submitted:

1. *Fastness to be considered:*

It is recommended that fastness to washing and fastness to light only be considered. Other fastness is in general of more limited importance to the purchasing public, and may be taken up at some future time if thought desirable.

2. *Classification:*

In order to have a flexible classification that will meet all possible requirements of the trade as well as to avoid any possibility of misunderstanding, fabrics should be classified independently with respect to fastness to light and fastness to washing.

Three classes of fastness to light and three classes of fastness to washing are of practical importance and should be designated and defined by this Committee and recommended for adoption by the trade. These classes are:

A. The best of the "fast" colors, i. e., those which will stand unusual treatment.
B. Good colors, those which will stand ordinary light exposure in the one case or reasonable laundry treatment in the other.
C. Commercial colors, of no particular fastness.

Recognition by the trade of these classes of fastness does not obligate anyone to the use of all of them. Mr. Manley has indicated four groups of fabrics in which he is interested and Mr. Bancroft four somewhat different groups. Others no doubt have still different groups of colors whose fastness characteristics they would like to describe. All can find the means in the system recommended.

It is believed the use of the terms A, B, and C for the classes will be better than adopting terms already in use, such as sunfast, washable, tub-fast, etc., and trying to define them.

3. *Tests:*

To be of value the classification ultimately adopted must be founded on definite fastness tests which can be applied in a disputed case. We recommend the following simple laboratory tests for the classes of fastness of cotton fabrics.

Fastness to Washing

Class A.—Cotton fabrics which show practically no alteration in color and practically no staining of white cotton in the following test:

Test for Solid Color Fabrics.—The fabric to be tested, to which has been sewn a smaller piece of white cotton cloth, is immersed for thirty minutes in 100 times its weight of a boiling solution containing 0.5 per cent soap* and 0.2 per cent anhydrous sodium carbonate. It is then removed, rinsed thoroughly in tepid water and dried in a current of air at ordinary temperature. The sample is then moistened with water and pressed dry with a hot iron whose temperature is such that the iron will not brown the white material and will not be wetted by drops of water.

Test for Fabrics Having Colored Designs or Stripes on a White Ground.—The test given for solid color fabrics is applied with the following addition: After rinsing, the sample is immersed in a sodium hypochloride solution containing 0.01 per cent of available chlorine for ten minutes at 160 deg. Fahr. It is then removed, rinsed in tepid water, and immersed in a solution containing 0.05 per cent acetic acid for ten minutes at 105 deg. Fahr. Finally, it is rinsed thoroughly in tepid water, dried in a current of air at ordinary temperature, moistened and ironed as described above.

Class B.—Cotton fabrics which show practically no alteration in color and practically no staining of white cotton in the following test:

Test for Solid Color Fabrics and for Fabrics Having Color Designs or Stripes on White Ground.—This test is identical with that given under Class A for solid color fabrics, except that the temperature of the wash solution is to be 120 deg. Fahr.

Class C.—Cotton fabrics which do not meet the requirements of Class A or B.

Fastness to Light

Class A.—Cotton fabrics which show practically no alteration in color when exposed to daylight under glass under the conditions prescribed below for the equivalent of thirty consecutive days between May 1 and August 1.

All samples are to be exposed at an angle of 45 degrees facing due south, in a cabinet covered with a good grade of window glass approximately one-eighth of an inch thick, and open at the sides in such a way as to allow free circulation of air over the samples. The distance between the samples and the glass should be approximately one-half inch. A portion of each sample is to be protected from the light by opaque material, for instance, black cardboard.

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*A neutral chip soap which meets the requirements of Federal Specification No. 1, Chip Soap (Bureau of Standards Circ. 128, obtainable from the Superintendent of Documents, Government Printing Office for five cents) is prescribed. "Lux" or "Ivory" flakes may be used.

Class B.—Cotton fabrics which show practically no alteration in color when exposed under the conditions prescribed above for the equivalent of five consecutive days between May 1 and August 1.

Class C.—Cotton fabrics which do not meet the requirements of Class A or B.

4. *Fastness Guarantee:*

The classes of fastness and the tests by which they are defined give a satisfactory means of indicating the fastness of a cotton fabric. At the discretion of the firm labeling the goods, their fastness to light only, to washing only, or to both light and washing may be indicated. The use of the undefined terms now prevalent in the trade should be abandoned.

The responsibility for the truthfulness of the label rests with the firm putting out the goods. To make the label a guarantee does not increase this responsibility. It may give the purchaser of the fabric a false sense of value in guaranteed goods as against those which are not guaranteed. We recommend that the textile trade follow the action of certain other industries and abandon the guarantee.

If this step cannot be agreed upon, the following form of a guarantee is proposed:

*Fastness Guarantee**

The fastness of the color of this fabric is guaranteed by ..... to be as follows:

Fastness to Light.... Class....
Fastness to Washing.... Class....

*Ask your dealer for explanatory leaflet.

5. *Qualifications:*

It is deemed inadvisable to print qualifications of the classification on the fastness label or the guarantee. Such qualifications would be inadequate. We recommend that an attractive folder be prepared for distribution wherever the fabrics are sold. This folder would be a joint product of the various organizations represented on the main committee. It would contain a simple statement of the aim of the new type of label, tell what each class of fastness may be expected to do, give methods of laundering colored fabrics, and other information of practical interest to the user of such materials. Such a folder might well be made a medium for a certain amount of educational matter to enable the consumer to judge more intelligentlv as to the proper use and the limitations of dyed fabrics in general. It would probably not be best to publish in such a folder the technical methods of determining the classes.

Many other means of acquainting the public with the new practice suggest themselves at once.

6. *Note:*

The original report was submitted to the committee at the meeting on May 26, 1926. In formulating it we had in mind more particularly the number of classes which should be required and the general basis for the establishment of such a classification. The specific range of fastness to be covered by each class was left open for consideration by the committee, though the illustrative data used were based upon the ideas of a number of men directly interested in the establishment of such standards

The suggestions offered at the meeting of May 26, and in subsequent correspondence, have been carefully considered in writing this revised report, and a number of technical experts have been consulted in formulating the tests and classes recommended.

(Signed) L. A. Olney.
Wm. D. Appel.

In accepting this report the committee commented as follows:

Your subcommittee begs to report on its activities, advising you that two of its members—Prof. L. A. Olney, president, American Association of Textile Chemists and Colorists, and Mr. W. D. Appel, of the Bureau of Standards—were requested to give their best thought to the question as to the limitation of color, and their findings form the basis of this report to your body. Furthermore, we advise you that the subcommittee as a whole, accepts the findings of these gentlemen as the very best judgment available, reaching this conclusion after being advised by the gentlemen named that the individual members of the Research Committee of the American Association of Textile Chemists and Colorists, whose names are a part of the appended report, concur in their findings.

The subcommittee further recommends that it would be perfectly practical and feasible to divide colors into three classes as to washing, and three classes as to light: tickets and labels affixed to textiles to indicate the expectancy, as illustrated in a manner as follows:

W—Class 1 L—Class 1

The foregoing illustration meaning that the color shown is of the 1st class both as to washing and light, but where a fabric is of 1st class as to washing, and 2nd class as to light, that would be indicated as follows:

W—Class 1 L—Class 2

This same procedure can be followed even in those instances where a fabric may be fast to washing, but fugitive to light, or the reverse.

Should the textile industry conclude to adopt this method as a general one for the indicating of color valuation in textiles, there would still be the need of educating the public to a proper understanding of its meaning, which, however, is neither impossible nor extremely difficult, clearly shown by the general understanding of today as to the quality of milk, indicated by Grades A, B, C, or barley and prunes, known as Nos. 1, 2, 3, and many other commodities similarly graded.

There is represented in the membership of the Joint

Committee organizations functioning for the protection and guidance of the consuming public, and we are reasonably assured in advance, that their organized effort will be used to the limit possible, and for the purpose of helping the public to help itself.

Respectfully submitted,

M. J. WARNER, *Chairman.*

December 8, 1926.

HARD WATER AND ITS EFFECT ON THE SCOURING AND DYEING OF COTTON AND WOOL UNIONS

(*Continued from page* 846)

"washy" looking face, with the shoddy stocks dyed up to a full shade and the new wool, perhaps, only stained. Such an appearance cannot be corrected in a union bath using hard water, without impairing the appearance of the cotton center. However, by dyeing the wool faces first with acid colors, where we can boil till the color is up to standard, the wool faces look very smooth and bright, all the different stocks being about the same color and depth, and dyed better than they ever could be in a union bath in hard water. In this method it is very important to leave the wool face a little lighter in color than the finished sample requires, to allow for darkening by the cotton dyestuff in the second bath. It is also important to use an organic acid in the dyeing instead of the usual sulphuric acid. Sulphuric acid cannot be readily removed from woolen goods, and even though neutralized with soda, its effect is still very apparent if an attempt is made to give the cotton a bath of cotton dyestuff after dyeing the wool face with sulphuric acid present. In such a case the cotton dyestuff would render the wool face much darker than desired, but without streaking or staining. Acetic and formic acids are much better for such use than sulphuric acid.

For the second bath of the two-bath method, cotton dyestuffs dyeing cotton in a cold bath are used exclusively and shaded if necessary with neutral dyeing wool colors. The bath is first made alkaline with soda ash or ammonia, and the required dyestuffs and common salt added. It is recommended that the goods be taken out of the second bath as soon as possible where shoddy is used in the manufacture of the wool faces, as shoddy dyed with many acid colors is very readily stripped in the presence of soda and ammonia. In general it may be said that the shorter the time used in the second bath, the better will be the results obtained.

USE OF BASIC COLORS

In dyeing unions in hard water, basic colors cannot be made use of successfully on piece goods without the appearance of streaks or bronzy places, and, oftentimes, crocking or rubbing of the color. What little basic color is used under these circumstances must be only in the nature of a light topping, as it is troublesome to apply and gives results of a very mediocre order. With soft water this would not be the case, for basic colors may be made use of in soft water almost at random, giving perfect or nearly perfect results with no extraordinary precautions. The only special requirement for their use in soft water is that they must be kept separate from other dyestuffs in the formula while dissolving and feeding onto the goods.

With union dyeing in soft water there is, moreover, a distinct saving in dyestuff used as compared with union dyeing in hard water, running in some cases to as high as 20 to 25 per cent. Besides the saving of dyestuff by the use of soft water as compared to hard water, there is the advantage of greater production, less handling of the goods and more level results in wool-faced goods as between the wool face and cotton center. Basic colors may also be used in soft water where the desired color requires them, while it is practically impossible with hard water. In addition, soft water, when used in the scouring and dyeing of unions, imparts a clean, lofty feel to the goods that can never be approached by use of hard water.

There are several methods suggested for softening the dye bath where hard water occurs, all of them depending for their success upon the alkali or soap present in the then softened bath to prevent the cotton dyestuff from leaving the cotton to go onto the wool. Some of them are as follows: dyeing with soap and soda added to the bath; soap and phosphate of soda; phosphate of soda alone. These methods are more applicable to waters of low degree hardness, such as two to three degrees per gallon, where they prove satisfactory in many cases. For harder waters, such as those containing from eight to fifteen degrees hardness per gallon, they are not valuable in most cases.

For waters of high degree hardness it is more advisable to install a water softener of the zeolite exchange type than to attempt to get around scouring and dyeing troubles caused by hardness in the water. In spite of all the care that can be taken in the use of hard water in scouring and dyeing, troubles will occasionally arise through ignorance, finally resulting in expensive errors which would never have happened with soft water.

Thies Dyeing & Processing Company, Central Falls R. I., has been incorporated with capital of $50,000 preferred and 2,000 shares common, no par value. The company will soon start a plant at Central Falls. Incorporators are John A. Bennett, Daniel J. Healey and Ira Marcus, of Providence. George W. Steiger, 500 Fifth Avenue, New York, is financially interested in the company.

FOREIGN DYE TRADE

DYE SITUATION IN NANKING, CHINA

The value of imports of aniline dyes increased from $6,326 during the 1925 June quarter to $10,842 in the same quarter, 1926, while the imports of artificial indigo fell off from 261 short tons to 223 short tons. The recovery in aniline dyes brought the figure for this commodity back to practically what it had been during the 1924 June quarter, according to Consul John K. Davis, Nanking.

In general the figures of the Maritime Customs tell only a small part of the story, as the greater proportion of these commodities consumed here are brought in by rail and do not appear in the customs returns. These lines, as well as most others, were adversely affected by the general lack of commercial confidence, and the interruption of through traffic on the Tientsin Pukow Railway has prevented their normal distribution to interior points.

American manufacturers have held a fair share of this market which they have worked from headquarters established in Shanghai. An efficient organization in China, thoroughly familiar with the peculiarities of Chinese demands is a prerequisite of success in marketing dyes, and practically nothing can be done by long range methods.

The strongest competitors of the American importers are the Germans, who dominated the market prior to the war, and are rapidly regaining their former position by means of forming Chinese companies to handle the actual distribution of the various interior cities.

GERMAN DYES IN JAPAN

Despite the licensing system applicable to German dyes since the war, the German dye industry continues to dominate the Japanese market, and at present is supposed to have stocks on hand sufficient for normal sales for a year and a half. The German Dye Trust maintains an elaborate selling organization in Kobe, which, although somewhat reduced recently, is able to canvass the dye-consuming industries intensively and by reason of the flexible export policies of the home office, to make price and other concessions according to market exigencies.

The maintenance of heavy spot stocks accumulated during the last three years under the lower import duties in effect prior to April 1, 1926, is naturally a great advantage. How considerable they are is indicated by the comparative imports into Japan since the beginning of 1923, as shown by the table below.

The Dye Trust has recently inaugurated a new system of selling to Japanese consumers, whereby stocks are delivered to textile mills and other purchasers against payments when used and at the then current domestic prices. This is obviously an attractive selling system for the consumer, which American and other foreign producers may find it difficult to compete with on account of their looser organization and intranational competition. The German Trust is also reported to be following its traditional price-dumping policy as occasion demands (in the case of indigo, for instance). This is not unwelcome to the Japanese, except from the standpoint of customs duties received, since the great bulk of German licensed dyes are not produced locally.

It is doubtful that the consumption of German dyes will be greatly stimulated when the pending commercial treaty between Japan and Germany becomes effective. While the treaty will not formally discriminate against competitive German colors, they will still be subject to an agreement preventing the import of such dyes except in accordance with the wishes of the Japanese Government. There may be a tendency to admit specified quantities of colors made in Japan, which would reduce the market for American and other foreign dyes, but it seems unlikely that total German sales will be materially increased. The removal of the formal embargo on German goods is, nevertheless, a disadvantage to American producers because of the greater uncertainty in authorizing specific shipments.

Imports of dyes from Germany, the United States and Switzerland, the three chief countries of origin, since 1923, were as follows:

Country of Origin	Imports of Coal Tar Dyes (In thousands of yen)			
	1923	1924	1925	1926*
Germany	8,404	10,353	3,860	1,889
United States....	369	977	969	209
Switzerland	842	870	589	330

*Five months.

Note.—Yen equals par, $0.4985; 1923, $0.4853; 1924, $0.4119; 1925, $0.4104; 1926, five months' average, $0.4571.

DYESTUFFS MARKET IN IRELAND

There is no production of crudes, intermediates, or dyes in Ireland, and the lack of raw materials, technical resources and a ready market for the finished product makes the future establishment of a dyestuffs industry in that country doubtful, according to Vice-Consul H. M. Collins, Dublin.

The small but steady demand for synthetic dyes is principally from woolen factories of whom there are about thirty in operation. They are, however, relatively small and do not use large quantities of dyes. The only other demands are from dyeing and cleaning establishments and small woolen contract dyers

who dye for some of the smaller woolen and poplin manufacturers. There are about seven tanneries whose requirements create a certain market for tanning substances. Printing and lithographic establishments import their inks already prepared. Imports of dyes and tanning substances into the area now covered by the Irish Free State fell from 440,384 pounds, valued at $13,855.86 in 1914 to 130,140 pounds, valued at $3,799.95 in 1921. However, imports of "Dyes and Tanning Materials" into the Irish Free State amounted in 1924 to 714,896 pounds, valued at $160,876, and decreased slightly in quantity in 1925 to 710,080 pounds, valued at $161,091.

Most of the dyes imported into Ireland came from Great Britain, with Germany ranking second.

JAPAN SEEKS INDEPENDENCE IN BULK COLORS

There are now twenty dyestuffs on which the Japanese Government has a fund to pay manufacturing subsidy grants under a law promulgated a year ago. Of these, seven are now available from the home industry. They are listed as follows, with the date at which actual production began: Quinoline Yellow, January; Safranine T, January; Beta-Naphthol Acid Anilide, May; Direct Violet, June; Direct Black BH, June; Chrome Black F, July; Rhodamine G, September.

The amount of these seven imported during 1925, with the market value, is given below:

	Kilos	Yen
Quinoline Yellow	27,000	280,000
Safranine T	7,000	30,000
Beta Oxy Naphthol Acid Anilide	60,000	360,000
Direct Violet	15,000	105,000
Direct Black BH	40,000	184,000
Chrome Black F	70,000	400,000
Rhodamine G Extra	10,000	170,000
Total	225,000	1,529,000

These figures show that the import is reduced more than they represent, since they are substituted for others not in the list. The result indicated above has been achieved by the Nippon Senryo Kaisha concern, which is endeavoring to produce the rest, as in the case of the Yura and Miike companies.

It is expected that three more will be available before the year closes, and that Japan will in two years not need to depend on other nations for the supply of the twenty. She will, it is thought, be self-supplying for all the dyestuffs of large consumption with the exception of a few high-grade materials.

Depression rules in dyestuffs owing to quietness at the weaving centers, where production has been reduced 50 per cent of the usual volume in view of the fluctuation in the cotton yarn market after the recent slump. Prices show signs of giving way, and price concessions are granted on the market. Requirements in connection with winter wares will be small, since dyeing works have closed operations for the season and contemplate starting work for the summer.

INDIGO CROP IN THE MADRAS PRESIDENCY

According to the report of the Department of Agriculture of India, the area planted with indigo in the Madras Presidency up to the end of August, 1926, is estimated at 40,100 acres, against 55,600 acres last year, a decrease of 28 per cent.

There is no information in regard to the quantity actually manufactured into dye, or cut and ploughed into wet land soils as green manure. Its use as green manure, however, is on the increase, especially in the Carnatic and Central Districts.

STEIN, HALL & CO. HOLDS ANNUAL MEETING AND DINNER

The annual meeting of the branch office managers and sales force of Stein, Hall & Co., Inc., was held at the home office of the company, 285 Madison Avenue, New York City, on December 16, 17 and 18.

A review of 1926 showed that the total sales were the largest in the history of the company, and projects were discussed and developed for the purpose of increasing the company's business beyond the high point reached in 1926.

Special emphasis was laid upon the subject of service to the trade. The company has made a number of substantial improvements during 1926 in its service departments, notably through the installation of the Control and Research Laboratory connected with the home office. This laboratory, in conjunction with the factory laboratory, is devoted to scientific research in connection with the industrial and manufacturing uses of tapioca flour, sago flour, starches, dextrines, gums and other products in which the company deals.

After the meeting the company gave a dinner and theater party to its branch officers and sales force, comprising over fifty men.

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i. e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

DYESTUFF SALESMAN WANTED

Manufacturer of Acid, Direct, Sulphur and Oil Soluble Colors has this position open for a "live wire." Applicant must be well known and have a good following. Opportunity also for investment. Reply American Dyestuff Reporter, Box 372.

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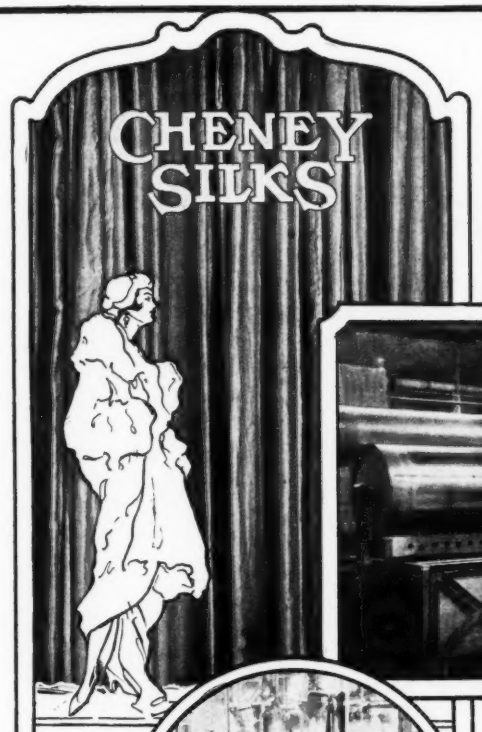

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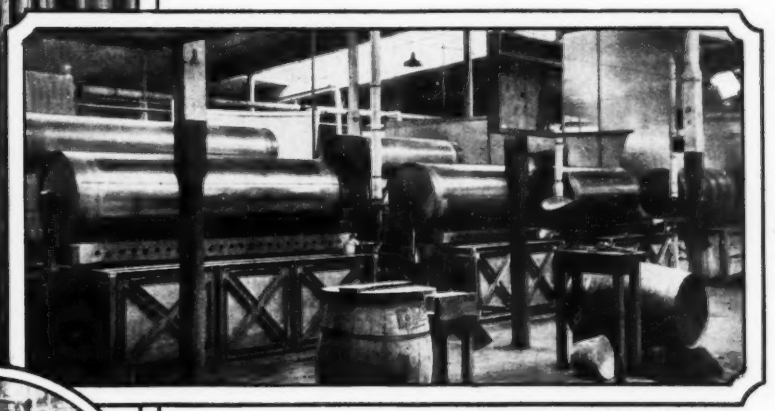

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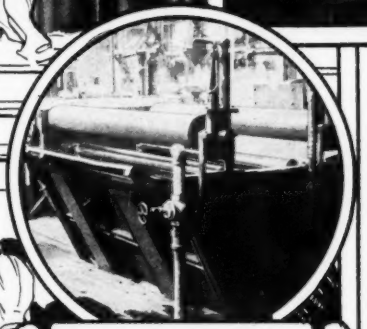

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1—66″ Windle Cloth Doubling and Winding Machine.
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1—Davis & Furber 2 Cylinder Warp Dresser.
2—36″ Curtis & Marble Rolling-Up or Boarding Machines.
1—40 Spindle Morrison Skein Silk Washing Machine.
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1—28 Stick Klauder-Weldon Yarn Dyeing Machine.
1—600 lb. Klauder-Weldon Yarn Dyeing Machine.
2—300 lb. Hussong Yarn Dyeing Machines.
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1—Set Granger 20 Copper Can Cylinder Dryer; 23″ dia. by 56″ face.
3—Sets 10 Can Textile Finishing Machinery Cylinder Dryers; 23″ dia. by 60″ face.
1—Set Textile 28 Can Cylinder Dryer; 23″ dia. by 70″ face.
1—Set Textile Finishing Machinery 11 Can Cylinder Dryer; 23″ dia. by 72″ face, tinned steel.
1—Set Textile 12 Can Cylinder Dryer; 18¼″ dia. by 72″ face.
1—Set 26 Can Butterworth Cylinder Dryer; 23″ dia. by 90″ face.
1—Set 18 Can Butterworth Cylinder Dryer; 23″ dia. by 108″ face.
1—Set 18 Can Butterworth Cylinder Dryer, 23″ dia. by 142″ face.
1—Set 26 Can Butterworth Cylinder Dryer; 23″ dia. by 144″ face.
1—Set 30 Can Butterworth Cylinder Dryer; 23″ dia. by 144″ face.
1—Set 56 Can Butterworth Cylinder Dryer; 23″ dia. by 144″ face.
1—Sargent 3 Apron A-1 Raw Stock Dryer.
1—Proctor & Schwartz Automatic Yarn Dryer.
1—48″ Proctor & Schwartz Looping Dryer.
1—54″ Proctor & Schwartz Looping Dryer.
1—80″ Kenyon Return Tenter Dryer
1—96″ Proctor & Schwartz Looping Dryer.
3—Proctor & Schwartz 2 Truck Yarn Dryers.

Box 369, American Dyestuff Reporter, 90 William St., New York.

DON'T—

tie up money in idle machines. Somebody can use them, and that somebody reads this page. Try a classified.

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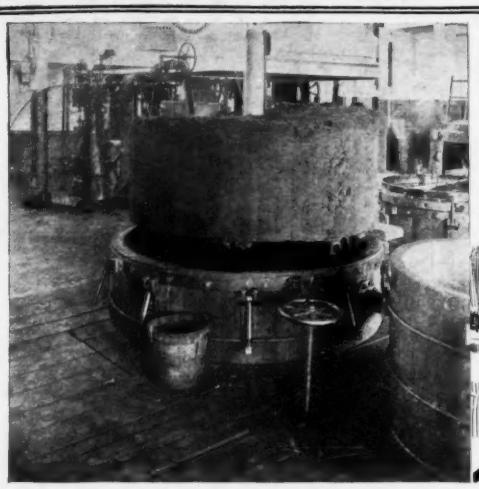

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